ABBREVIATIONS

(NOT ALL ABBREVIATIONS WILL APPLY TO THIS WORK)

Abbreviation	Meaning
A/E	ARCHITECT / ENGINEER
AAHX	AIR TO AIR HEAT EXCHANGER
AB	AIR BLENDER
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCH	AIR COOLED CHILLER
ACCU	AIR-COOLED CONDENSING UNIT
ACU	AIR CONDITIONING UNIT
ACD	AUTOMATIC CONTROL DAMPER, MODULATING
ACD-TP	AUTOMATIC CONTROL DAMPER, TWO POSITION
AD	ACCESS DOOR
AF	AFTER FILTER
AFCV	AIR FLOW CONTROL VALVE
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AFW	AIR FOIL WHEEL (FAN)
AHU	AIR-HANDLING UNIT
AMP	AMPERGE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
AS	AIR SEPARATOR
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AW	AIR WASHER
AXF	AXIAL FLOW
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BD	BUTTERFLY DAMPER
BDD	BACKDRAFT DAMPER
BDR	BASE BOARD RADIATOR
BFP	BACKFLOW PREVENTER
BFT	BOILER PLANT FIRE TUBE
BG	BOTTOM GRILLE
BHP	BRAKE HORSEPOWER
BHW	HOT WATER HEATING BOILER
BHX	BOILER BLOWDOWN HEAT EXCHANGER
BIW	BACKWARD INCLINED WHEEL (FAN)
BMS	BUILDING MANAGEMENT SYSTEM
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BR	BOTTOM REGISTER
BSC	BIOLOGICAL SAFETY CABINETS
BT	BLOWOFF TANK
BTC	BLOWOFF TANK CONTROL VALVE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BWT	BOILER PLANT WATER TUBE
C	CENTIGRADE (CELCIUS)
CC	COOLING COIL
CCD	COOLING COIL CONDENSATE DRAIN
CD	CEILING DIFFUSER
CD-1	CONSTRUCTION DOCUMENTS (SUBMISSION1)
CD-2	CONSTRUCTION DOCUMENTS (SUBMISSION2)
CENT	CENTRIFICAL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFT	CUBIC FEET
CFP	CHEMICAL FEED PUMP
CG	CEILING GRILLE
CH	CHILLER
CHP	CHILLED WATER PUMP
CHW	CHILLER WATER
CI	CAST IRON
CM	CARBON MONOXIDE
CM	CUBIC METER
CM/S	CUBIC METER PER SECOND
CO	CLEAN OUT
CO2	CARBON DIOXODE
COMP	COMPRESSOR UNIT
COP	COEFFICIENT OF PERFORMANCE
CP	CONDENSATE PUMP
CR	CEILING REGISTER
CS	CLEAN STEAM
CSG	CLEAN STEAM GENERATOR
CT	COOLING TOWER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME
CW	COLD WATER (POTABLE)
CWCC	CHILLED WATER COOLING COIL
CWP	CONDENSER WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
(D)	EXISTING ITEM TO BE DEMOLISHED AND/OR REMOVED
D	DAMPER – AUTOMATIC, OR CONDENSATE DRAIN
D-1	OUTDOOR AIR DAMPER
D-2	RETURN AIR DAMPER
D-3	RELIEF AIR DAMPER
DB	DECIBELS
Db	DRY-BULB TEMPERATURE
DD-1	DESIGN DEVELOPMENT (SUBMISSION1)
DD-2	DESIGN DEVELOPMENT (SUBMISSION2)
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DF	DIFFUSER
DIA	DIAMETER
DIW	DEIONIZED WATER
DP	DEW POINT TEMPERATURE
DP	DIFFUSER PLATE
DPA	DIFFERENTIAL PRESSURE ASSEMBLY
DPS	DIFFERENTIAL PRESSURE SENSOR
DX	DIRECT EXPANSION
DXCC	DIRECT EXPANSION COOLING COIL
(E)	EXISTING ITEM TO REMAIN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EVAPORATIVE COOLER
ECC	ENGINEERING CONTROL CENTER
ECU	EVAPORATIVE CONDENSER UNIT
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EGS	EMERGENCY GAS SHUTOFF
EGT	ENTERING GLYCOL TEMPERATURE
EH	EXHAUST HOOD
EJ	EXPANSION JOINT
EMD	END OF MAIN DRIP (STEAM)
ENT	ENTERING
ER	EXHAUST REGISTER
ERC	ELECTRIC REHEAT COIL
ERP	ELECTRIC RADIANT PANEL
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETO	ETHYLENE OXIDE
EUH	ELECTRIC UNIT HEATER
EWC	EVAPORATIVE WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EX.	EXISTING
F	FAHRENHEIT
F&T	FLOAT AND THERMOSTATIC
F/SDPR	COMBINATION FIRE SMOKE DAMPER
FA	FREE AREA
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT (4 PIPE)
FCUC	FAN COIL UNIT COOLING ONLY
FCUH	FAN COIL UNIT HEATING ONLY
FCW	FORWARD CURVED WHEEL (FAN)
FD	FLOOR DRAIN
FDX	FIRE DAMPER
FF	FINAL FILTER
FHX	FLUE GAS/FEEDWATER HEAT EXCHANGER
FM	FLOW METER
FOP	FUEL OIL PUMP
FOT	FUEL OIL TANK
FOHX	FUEL OIL HEAT EXCHANGER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FPTU	FAN POWERED TERMINAL UNIT
FR	FLOOR REGISTER
FRP	FIBER REINFORCED POLYESTER
FS	FLOW SWITCH
FSTAT	FREEZESTAT
FT	FEET
FT-LB	FOOT-POUND
FTR	FIN TUBE RADIATION
FV	FACE VELOCITY
GA	GAUGE
GAL	GALLONS
GH	GRAVITY HOOD
GHS	GLYCOL HEATING SUPPLY
GHR	GLYCOL HEATING RETURN
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPR	GAS PRESSURE REGULATOR
GS	GALVANIZED STEEL
H	HUMIDIFER
H&CW	HOT & COLD WATER
HAC	HOUSEKEEPING AID CLOSET
HB	HOSE BIBB
HC	HEATING COIL
HD	HEAD
HD	HOOD
HOA	HAND/OFF/AUTOMATIC
HP	HEAT PUMP
HP	HORSEPOWER
HPDT	HIGH PRESSURE DRIP TRAP
HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)
HPS	HIGH PRESSURE SUPPLY (STEAM)
HRC	HEAT RECOVERY COIL
HRD	HEAT RECOVERY DEVICE
HRP	HYDRONIC RADIANT (CEILING) PANEL
HRW	HEAT RECOVERY WHEEL
HSTAT	HUMIDISTAT
HTM	HUMIDIFIER TERMINAL
HUM	HUMIDIFIER UNIT MOUNTED
HVU	HEATING AND VENTILATING UNIT
HW	HOT WATER
HWC	HOT WATER COIL
HWHC	HOT WATER HEATING COIL
HWP	HEATING HOT WATER PUMP
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
HWUH	HOT WATER UNIT HEATER
HVD	HOISTWAY VENT DAMPER
HX	HEAT EXCHANGER
HZ	HERTZ
I/O	INPUT/OUTPUT
IAQ	INDOOR AIR QUALITY
IBT	INVERTED BUCKET TRAP
ICF	IN-LINE CENTRIFUGAL FAN
ICU	INTENSIVE CARE UNIT
ID	INSIDE DIAMETER
IFB	INTEGRAL FACE AND BYPASS
IN	INCHES
IN HG	INCHES OF MERCURY
IN WC	INCH WATER COLUMN
IN WG	INCH WATER GAUGE
IN-LB	INCH-POUND
IPLV	INTERGRATED PART LOAD VALUE
IRH	INTRARED HEATER
IS	INSECT SCREEN
IU	INDUCTION UNIT
IV	INLET VANES
kg	KILOGRAM
kg/HR	KILOGRAM PER HOUR
kPa	KILOPASCAL
kW	KILOWATT
kWh	KILOWATT HOUR
L	LITER
L/h	LITERS PER HOUR (OR LITERS/HOUR)
L/m	LITERS PER MINUTE (OR LITERS/MINUTE)
L/s	LITERS PER SECOND (OR LITERS/SECOND)
LAT	LEAVING AIR TEMPERATURE
LBS/HR	POUNDS PER HOUR
LF	LINEAR FOOT (FEET)
LGT	LEAVING GLYCOL TEMPERATURE
LH	LATENT HEAT
LPG	LIQUID PROPANE GAS
LPR	LOW PRESSURE RETURN (STEAM CONDENSATE)
LPRC	LOW PRESSURE STEAM RETURN (CLEAN)
LLHX	LIQUID TO LIQUID HEAT EXCHANGER
LPS	LOW PRESSURE STEAM
LPSC	LOW PRESSURE STEAM (CLEAN)
LSD	LINEAR SLOT DIFFUSER
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVG	LEAVING
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
M	METER, SI UNIT
M/s	METERS PER SECOND (OR METERS/SECOND)
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MB	MIXING BOX
MBH	1000 BTUH
MCA	MINIMUM BRANCH CIRCUIT AMPACITY
MER	MECHANICAL EQUIPMENT ROOM
MERV	MINIMUM EFFICIENCY REPORTING VALUE
MH	MANHOLE
MHP	MOTOR HORSEPOWER
MIN	MINIMUM
MM	MILLIMETER
MOV	MOTOR OPERATED VALVE
MPR	MEDIUM PRESSURE RETURN (STEAM CONDENSATE)
MPS	MEDIUM PRESSURE STEAM
MRI	MAGNETIC RESONANCE IMAGING
MTD	MEAN TEMPERATURE DIFFERENCE
MVD	MANUAL VOLUME DAMPER
MZ	MULTI-ZONE
NA	NOT APPLICABLE
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NG	NATURAL GAS
NGFM	NATURAL GAS FLOWMETER
NO	NORMALLY OPEN
NOAA	NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION
NOM	NOMINAL
NPLV	NON-STANDARD PART LOAD VALUE
NPSH	NET POSITIVE SUCTION HEAD
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAG	OUTSIDE AIR GRILLE
OAI	OUTSIDE AIR INTAKE
OD	OUTSIDE DIAMETER
OFM	OIL FLOWMETER
OR	OPERATING ROOM
P	PUMP
PA	PASCAL
PC	PUMPED CONDENSATE
PCF	POUNDS PER CUBIC FOOT (FEET)
PD	PRESSURE DROP
PEF	PROPELLER (TYPE) EXHAUST FAN
PF	PRE-FILTER
PG	PRESSURE GAGE
PGW	PROPYLENE GLYCOL-WATER (SOLUTION)
PHC	PREHEAT COIL
PPM	PARTS PER MILLION
PRS	PRESSURE REGULATING (VALVE) STATION
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH – ABSOLUTE
PSIG	POUNDS PER SQUARE INCH – GAGE
PSS	PRIMARY SECONDARY SYSTEM
PSV	PRESSURE SAFETY VALVE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
R/E	RETURN OR EXHAUST
RA	RETURN AIR
RAD	REFRIGERANT AIR DRYER
RAF	RADIO FREQUENCY
RAHX	ROTARY AIR HEAT EXCHANGER
RAT	RETURN AIR TEMPERATURE
RCCH	REMOTE CONDENSER CHILLER
RCU	RECIPROCATING CHILLER UNIT
RD	REFRIGERANT DISCHARGE
RDS	ROOM DATA SHEETS
REA	RELIEF AIR
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID LINE
RLA	RUN LOAD AMPERE
RO	REVERSE OSMOSIS
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
RV	RELIEF VALVE
SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SAT	SUPPLY AIR TEMPERATURE
SC	SHADING COEFFICIENT
SCFM	STANDARD CUBIC FEET PER MINUTE
SCI	SPINAL CODE INJURY
SCR	SILICON CONTROLLED RECTIFIER
SD	SMOKE DETECTOR
SD	SUPPLY AIR DIFFUSER
SD-1	SCHEMATIC DESIGN (SUBMISSION1)
SD-2	SCHEMATIC DESIGN (SUBMISSION2)
SDPR	SMOKE DAMPER
SDR	SMOKE DAMPER (RETURN)
SDS	SMOKE DAMPER (SUPPLY)
SEN	SENSIBLE HEAT
SF	SUPPLY FAN
SG	SUPPLY AIR GRILLE
SH	STEAM HUMIDIFIER
SHC	STEAM HEATING COIL
SI	SQUARE INCHES
SP	STATIC PRESSURE
SP GR	SPECIFIC GRAVITY
SPD	SUPPLY PROCESS AND DISTRIBUTION
SPRV	STEAM PRESSURE REDUCING VALVE
SPS	STATIC PRESSURE SENSOR
SQ FT	SQUARE FOOT (FEET)
SR	SUPPLY AIR REGISTER
SS	STAINLESS STEEL
SSHX	STEAM TO STEAM HEAT EXCHANGER
SSR	SOLID SEPARATOR
ST	STEAM TRAP
SUH	STEAM UNIT HEATER
SV	STEAM PRESSURE REDUCING VALVE
SVS	STEAM VENT SILENCER
SWHX	STEAM TO WATER HEAT EXCHANGER
T & PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
TAB	TESTING, ADJUSTING, BALANCE
TD	TEMPERATURE DIFFERENCE
TDH	TOTAL DYNAMIC HEAD
TDS	TOTAL DISSOLVED SOLIDS
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TP	TRAP
TR	TOP REGISTER
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TU	TERMINAL UNIT
TWU	THRU-WALL UNIT
UC	UNDER CUT
UC	UNIT COOLER
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORY
URV	UPBLAST UNIT VENTILATOR
V	VALVE
VAF	VANE-AXIAL FAN
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
VFD	VARIABLE FREQUENCY DRIVE
VHA	VETERANS HEALTH ADMINISTRATION
VI	VIBRATION ISOLATOR
VIV	VARIABLE INLET VANES
VP	VACUUM PUMP
VPS	VARIABLE PRIMARY SYSTEM
VR	VACUUM (STEAM CONDENSATE) RETURN
VSD	VARIABLE SPEED DRIVE
VUH	VERTICAL UNIT HEATER
W	WATTS
WAG	WASTE ANETHESIA GAS
Wb	WET-BULB (TEMPERATURE)
WC	WATER COOLED
WCCH	WATER COOLED CHILLER
WCCU	WATER COOLED CONDENSING UNIT
WCHP	WATER COOLED HEAT PUMPS
WCPU	WATER COOLED PACKAGED UNIT
WEF	WALL EXHAUST FAN
WF	WATER FILTER
WFCV	WATER FLOW CONTROL VALVE
WFM	WATER FLOWMETER
WFMD	WATER FLOW MEASURING DEVICE
WG	WATER GAGE
WPD	WATER SIDE PRESSURE DROP
YR	YEAR

CONTROLS SYMBOLS

(NOT ALL SYMBOLS WILL APPLY TO THIS WORK)

Symbol	Description
T	ROOM THERMOSTAT/TRANSMITTER – WALL MOUNT
M	ROOM HUMIDISTAT (MOISTURE)/TRANSMITTER – WALL MOUNT
TT	TEMPERATURE TRANSMITTER
TT	TEMPERATURE TRANSMITTER, AVERAGING ELEMENT
MT	MOISTURE (HUMIDITY) TRANSMITTER
PT	PRESSURE TRANSMITTER
SPS	STATIC PRESSURE SENSOR
FT	FLOW TRANSMITTER
IT	CURRENT TRANSMITTER
CT	CONDUCTIVITY TRANSMITTER
SD	SMOKE DETECTOR
PDT	PRESSURE DIFFERENTIAL TRANSMITTER
PDS	PRESSURE DIFFERENTIAL SWITCH
HS	HAND SWITCH (HAND-OFF-AUTO SWITCH)
ZC	VALVE OR DAMPER POSITION CONTROLLER
KR	LOCAL RECORDING TIME CLOCK RUNTIME)
TSL	TEMPERATURE SWITCH, LOW (FREEZESTAT)
TSH	TEMPERATURE SWITCH, HIGH FREEZESTAT)
LC	LEVEL CONTROLLER
LT	LEVEL TRANSMITTER
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
RAH	RETURN AIR HUMIDITY SENSOR
EPT	ELECTRONIC TO PNEUMATIC TRANSDUCER
AT CO2	CARBON DIOXIDE TRANSMITTER
AT CO	CARBON MONOXIDE TRANSMITTER
AT OC	OCCUPANCY SENSOR
ECC	ENGINEERING CONTROL CENTER
AFMD	AIR FLOW MEASURING DEVICE
LTCP	LOCAL TEMPERATURE CONTROL PANEL
HVAC	HVAC CONTROL PANEL
VSMC	VARIABLE SPEED MOTOR CONTROLLER
ECC	INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION AT ENERGY CONTROL CENTER
TC	TEMPERATURE CONTROLLER; SEE SEQUENCE OF OPERATION
PC	PRESSURE CONTROLLER; SEE SEQUENCE OF OPERATION
SC	SPEED CONTROLLER; SEE SEQUENCE OF OPERATION
FC	FLOW CONTROLLER; SEE SEQUENCE OF OPERATION
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
KC	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE
MC	HUMIDIFIER CONTROL VALVE
	TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO EMCS (PROVIDE 12 INCHES MINIMUM LENGTH IN DUCT WHEN SPACE PERMITS.)
A	SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO EMCS
	MOTOR STARTER
M	ELECTRIC OPERATED CONTROL DAMPER/OR VALVE

DUCTWORK SYMBOLS

(NOT ALL SYMBOLS WILL APPLY TO THIS WORK)

Symbol	Description
UP / DN	SUPPLY DUCT (UP & DOWN)
UP / DN	EXHAUST DUCT (UP & DOWN)
UP / DN	RETURN DUCT (UP & DOWN)
	EXHAUST OR RETURN CEILING REGISTER OR GRILLE
	EXHAUST OR RETURN BOTTOM REGISTER OR GRILLE (WALL TYPE)
	EXHAUST OR RETURN REGISTER OR TOP GRILLE (WALL TYPE)
	VANED ELBOW & AIR SPLIT TYPE DUCT TAKE-OFF
	CONNECT NEW DUCT TO EXISTING DUCT
R	INCLINED RISE, IN DIRECTION OF AIR FLOW
D	INCLINED DROP, IN DIRECTION OF AIR FLOW
	LIMIT OF DEMOLITION
FC	FLEXIBLE CONNECTION, EQUIPMENT, VIBRATION, OR SEISMIC
	VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)
	VANED ELBOW (SHORT RADIUS)
	STANDARD RADIUS ELBOW (LONG RADIUS)
10x8	NEW DUCT (INSIDE DIMENSIONS: WIDTH x DEPTH)
	EXISTING DUCT TO REMAIN
	EXISTING DUCT TO BE REMOVED
	LOUVER (LOUVER SPECIFIED IN ARCHITECTURAL SECTION.)
	FLEXIBLE DUCTWORK (INSULATED)
	DUCT WITH SOUND LINING
VD	MANUAL VOLUME DAMPER
FD	FIRE DAMPER
BDD	BACK DRAFT DAMPER
2 1 / 4 / 1/2	POINT OF CHANGE IN DUCT CONSTRUCTION BY STATIC PRESSURE CLASS. THE NUMBER ASSIGNS PRESSURE CLASS (IN. OF WATER) WHICH WILL ACCOMMODATE MAXIMUM OPERATING PRESSURE IN THE DUCT SUBSECTION. THE SYMBOL CONTINUES THE ASSIGNMENT UNTIL THE DUCT TERMINATES OR ANOTHER SYMBOL APPEARS. A "N" SUPERSCRIPT INDICATES NEGATIVE PRESSURE.
	AUTOMATIC CONTROL DAMPER MODULATING
	AUTOMATIC CONTROL DAMPER TWO POSITION
	STAINLESS STEEL DUCT
	MANUAL SPLITTER DAMPER
45° SUPPLY / 45° RETURN	STANDARD BRANCH SUPPLY OR RETURN, NO SPLITTER (45° TAP)
	DUCT MOUNTED COIL (HOT WATER OR STEAM COIL)
	DUCT MOUNTED COIL

MECHANICAL LEGEND

(REFER TO MECHANICAL DEMOLITION (MD SERIES), NEW WORK (MH SERIES), AND PIPING PLANS (MP SERIES) FOR LOCATIONS)

Symbol	Description
A1 / MD601	PHOTO INDICATOR
CWR	EXISTING CHILLED WATER RETURN
-CWS-	EXISTING CHILLED WATER SUPPLY
—D—	EXISTING CONDENSATE DRAIN
-HWS-	EXISTING HOT WATER SUPPLY
HWR	EXISTING HOT WATER RETURN
CWR	NEW CHILLED WATER RETURN
-CWS-	NEW CHILLED WATER SUPPLY
-HWS-	NEW HOT WATER SUPPLY
HWR	NEW HOT WATER RETURN
	DIRECTION OF PIPE PITCH (DOWN)
	DIRECTION OF FLOW
	ANCHOR
	REDUCER OR INCREASER
	ECCENTRIC REDUCER
	TOP CONNECTION, 45° OR 90°
	BOTTOM CONNECTION, 45° OR 90°
	SIDE CONNECTION
	CAPPED OUTLET
	RISE OR DROP IN PIPE
	UNION
	PIPE UP
	PIPE DOWN
	INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
	FLOAT & THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
	THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
	THERMOMETER
	PRESSURE GAGE
FE	FLOW ELEMENT
	REFRIGERANT SIGHT GLASS
	TEST PLUG (PRESSURE/TEMPERATURE)
AV	AUTOMATIC AIR VENT
MV	MANUAL AIR VENT
	QUICK-COUPLE HOSE CONNECTOR

ARCHITECTURAL LEGEND

(REFER ARCHITECTURAL DRAWINGS FOR LOCATIONS AND DETAILS)

Symbol	Description
	FIRE RESISTIVE RATED LINE, 2 HOUR
SR	NON-RATED SMOKE RESISTIVE
	AREA NOT IN CONTRACT

GENERAL NOTES

A. COORDINATE ALL WORK WITH EXISTING CONDITIONS, ALL OTHER TRADES, AND IN ACCORDANCE WITH ALL STATE, LOCAL AND NATIONAL CODES, AS WELL AS WITH ALL FEDERAL HEALTHCARE REGULATIONS.

B. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES, PERMITS AND LICENSES FOR THE COMPLETE INSTALLATION OF THEIR WORK.

C. BEFORE ANY WORK IS STARTED, THE CONTRACTOR SHALL MAKE A THOROUGH SURVEY WITH THE COR IN WHICH ALTERATIONS OCCUR AND AREAS WHICH ARE ANTICIPATED ROUTES OF ACCESS, AND FURNISH A REPORT. REPORT SHALL BE SIGNED BY BOTH COR AND CONTRACTOR, AND SHALL BE PROVIDED TO THE CONTRACTING OFFICER.

D. ALL NEW HVAC EQUIPMENT AND DDC CONTROLS SHALL BE TIED BACK INTO EXISTING CONTROL SYSTEM AT NEAREST ETHERNET HUB.

E. ALL EXISTING SPRINKLER HEADS, PIPES, ALARMS, ETC. ARE TO REMAIN INTACT FOR USE AFTER RENOVATION. SPRINKLER SYSTEM SHALL REMAIN IN OPERATION THROUGHOUT PERIOD OF WORK. CONTRACTOR SHALL ENSURE THAT NO DAMAGE IS DONE TO EXISTING SPRINKLER SYSTEM – I.E. PROTECTIVE CAGES SHALL BE INSTALLED OVER SPRINKLER HEADS DURING RENOVATION, ETC.

F. CARE SHOULD BE TAKEN BY ALL CONTRACTORS TO AVOID DAMAGING OR DISTURBING EXISTING CONSTRUCTION WHICH IS TO REMAIN. CONTRACTORS SHALL BE RESPONSIBLE FOR MAKING ANY REPAIRS NECESSARY TO RECTIFY DAMAGED AND RESTORE EXISTING CONSTRUCTION TO UNDAMAGED STATE UPON COMPLETION OF WORK AT NO EXPENSE TO OWNER.

G. ALL ELBOWS IN DUCTWORK SHALL BE LONG RADIUS. RECTANGULAR ELBOWS SHALL BE SUPPLIED WITH TURNING VANES.

H. ALL NEW DEVICES, EQUIPMENT, CONTROLS, ETC. (INCLUDING BUT NOT LIMITED TO: VAV'S, COILS, GRILLES, REGISTERS, AND DIFFUSERS, HOT WATER PIPING, ETC.) SHALL BE TESTED AND BALANCED AS PART OF THIS WORK. EXISTING EQUIPMENT TO REMAIN SHALL BE TESTED AND BALANCED AS NOTED ON DRAWINGS.

I. ALL EQUIPMENT, PIPING, THERMOMETERS, GAGES, VALVES, ETC. THAT ARE LOCATED OUTSIDE SHALL BE OF OUTDOOR-USE QUALITY. THE WINTER ENVIRONMENT CAN BE COLD, ICY, AND THE PRESENCE OF SALT DURING PERIODS OF SNOW RENDERS IT CORROSIVE – CONTRACTOR SHALL SEEK APPROVAL FROM VA ENGINEERING STAFF AND PARADIGM ENGINEERS AND CONSTRUCTORS BEFORE PURCHASING ANY EQUIPMENT.

J. ALL DUCT WORK RUNS SHOWN ARE REPRESENTATIVE ONLY. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF HVAC PIPING AND DUCTS COORDINATED WITH EXISTING CONDITIONS IN THE FIELD (EXISTING, OR PREDICATED BY LOCATION OF NEW EQUIPMENT) THAT MAKE NECESSARY OFFSETS OF DUCTWORK AND PIPING.

K. PIPING RUNS SHOWN ARE REPRESENTATIVE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CONDITIONS IN THE FIELD (EXISTING, OR PREDICATED BY LOCATION OF NEW EQUIPMENT) THAT MAKE NECESSARY ALTERNATE ROUTING OF PIPING.

L. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR TO PROVIDE POWER CONNECTIONS FOR ALL EQUIPMENT.

M. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING (PATCHING, SEALING, FIRE-STOPPING) ALL ABANDONED WALL PENETRATIONS AND ANY NEW PENETRATIONS CREATED FOR DUCT, PIPE, AND CONDUIT.

N. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY ARCHITECTURAL WORK CONDITION THEY WERE FOUND. ASSOCIATED CONTROL POINTS FOR DEVICES AND EQUIPMENT SHALL BE DECOMMISSIONED AND REMOVED FROM LON WORKS ENGINEERING CONTROL CENTER COMPLETE.

O. ALL CONTROL DEVICES DEMOLISHED SHALL BE TURNED OVER TO OWNER IN THE CONDITION THEY WERE FOUND. ASSOCIATED CONTROL POINTS FOR DEVICES AND EQUIPMENT SHALL BE DECOMMISSIONED AND REMOVED FROM LON WORKS ENGINEERING CONTROL CENTER COMPLETE.

P. ALL CONTROLS COMPONENTS, SWITCHES, CONTROLLERS MOTORIZED DAMPERS VALVES SHALL BE OPERATED AND VIEWABLE ON THE EXISTING CONTROLS SYSTEM. ANY DEVIATION SHALL BE EXPLAINED AND PRE-APPROVED BY THE HOSPITAL UTILITIES DEPARTMENT.

Q. CONTROL VALVES SHALL BE 0-10 VOLT.

R. CONTROL PANELS SHALL BE CONNECTED TO EMERGENCY POWER.

S. WATER COILS SHALL BE 100% DRAINABLE.

T. CHEMICALLY CLEAN AND FLUSH ALL NEW HVAC WATER LINES PRIOR TO FINAL CONNECTIONS TO EXISTING SYSTEMS. PROVIDE TAP-INS AND TEMPORARY PUMPS TO FACILITATE CIRCULATION OF CLEANING AGENT. REMOVE TEMPORARY PUMPS ONCE LINES HAVE BEEN TESTED AND APPROVED FOR CLEANLINESS.

U. MAINTAIN COMPLETE ACCESS TO ALL ASSOCIATED HVAC, ELECTRICAL AND PLUMBING CONTROLS, VALVES, SWITCHES, DISCONNECTS, ACCESS DOORS AND ACCESS PANELS. COMPLETED CONSTRUCTION SHALL ALLOW ACCESS TO THESE COMPONENTS FOR USE, MAINTENANCE, REPAIR AND REPLACEMENT.

V. DOCUMENTATION: CONTRACTOR SHALL PROVIDE A MINIMUM OF (3) HARD COPIES OF TECHNICAL MANUALS, AS-BUILT DRAWINGS, AND MANUFACTURER'S OPERATION AND MAINTENANCE MANUALS. ALSO PROVIDE SAME INFORMATION ON COMPACT DISK.

W. ALL PIPING ABOVE GRADE SHALL HAVE AN EXPOSED TAG TO IDENTIFY THE PIPE. EACH PIECE OF EQUIPMENT SHALL BE INSTALLED AS FREE FROM NOISE AND VIBRATION.

X. EACH PIECE OF EQUIPMENT SHALL BE INSTALLED AS FREE FROM NOISE AND VIBRATION.

Y. ALL WORK IS TO OCCUR IN OCCUPIED BUILDING SPACES, WITH PATIENTS AND STAFF DIRECTLY ABOVE AND BELOW WORK AREAS. CONTRACTOR IS TO COORDINATE ALL WORK, INCLUDING DEMOLITION OF EXISTING UTILITIES, TO AVOID INTERRUPTION OF UTILITIES IN ALL ADJACENT AREAS.

Z. THE MECHANICAL CONTRACTOR SHALL REFERENCE THE PHASING DRAWINGS FOR PHASING REQUIREMENTS OF PROJECT. PHASING SHALL BE INCLUDED IN BASE BID.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

PARADIGM ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

STATE OF KENTUCKY – LICENSED PROFESSIONAL ENGINEER (seal)

Drawing Title	MECHANICAL ABBREVIATIONS, SYMBOLS, AND GENERAL NOTES
Project Title	REMODEL CARDIAC CATH LAB SUITE
Project Number	635-CS1-102
Building Number	F
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Location	OKLAHOMA CITY VAMC, 921 NE 13TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Drawing Number	M-001

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231

NOTES

A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

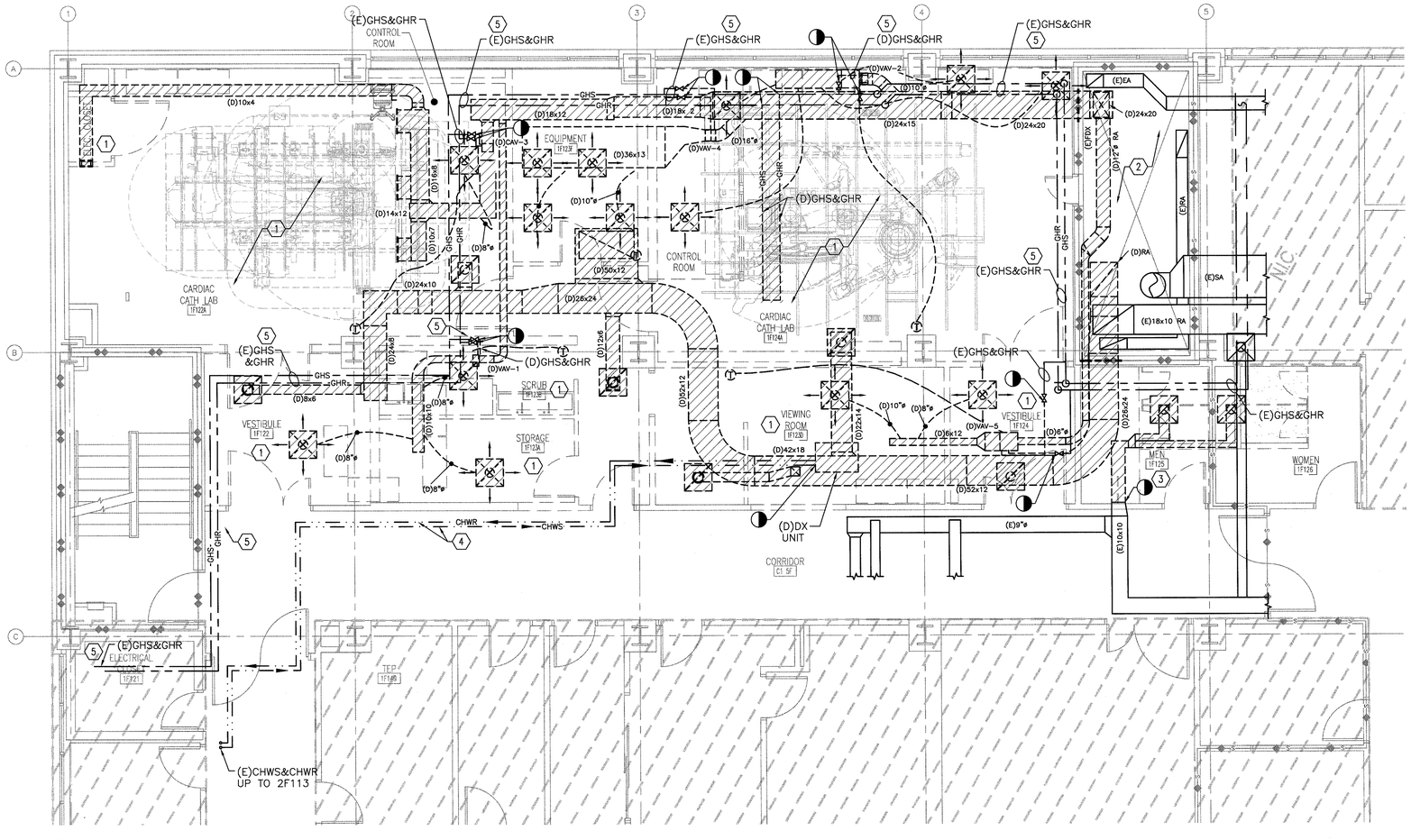
B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

C. REFER TO SHEET MH101 FOR MECHANICAL HVAC NEW WORK.

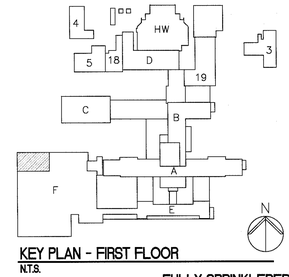
D. REFER TO SHEET MP101 FOR MECHANICAL PIPING NEW WORK.

KEY NOTES ⬡

1. REMOVE ALL TERMINAL UNITS, CONTROLS, DUCTWORK, AND AIR DEVICES FROM THE EXISTING FIRE DAMPER. CONNECT AS INDICATED ON MH101.
2. ALL EXISTING DUCTWORK WITHIN SHAFT TO REMAIN.
3. REMOVE EXISTING EXHAUST DUCT FROM THIS POINT.
4. EXISTING CHILLED WATER SUPPLY AND RETURN LINES TO REMAIN.
5. EXISTING GLYCOL LINES TO REMAIN.



F1 PARTIAL FIRST FLOOR PLAN
SCALE 1/4" = 1'-0"



KEY PLAN - FIRST FLOOR
N.T.S.

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BID DOCUMENTS
FOR CONSTRUCTION

Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

PARADIGM
ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

STATE OF KENTUCKY
BLAIRE CASSEL VAN GAMBEKE
34,798
LICENSED PROFESSIONAL ENGINEER
19 Oct 2015

Drawing Title	MECHANICAL HVAC AND PIPING DEMOLITION PLAN FIRST FLOOR
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Project Title	REMODEL CARDIAC CATH LAB SUITE
Location	OKLAHOMA CITY VAMC 921 NE 13TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Project Number	635-CS1-102
Building Number	F
Drawing Number	MD101

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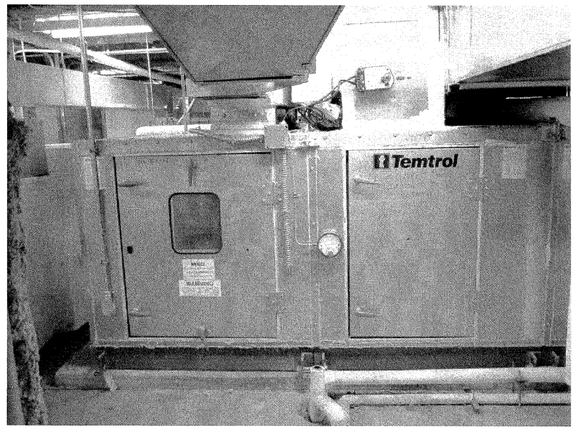
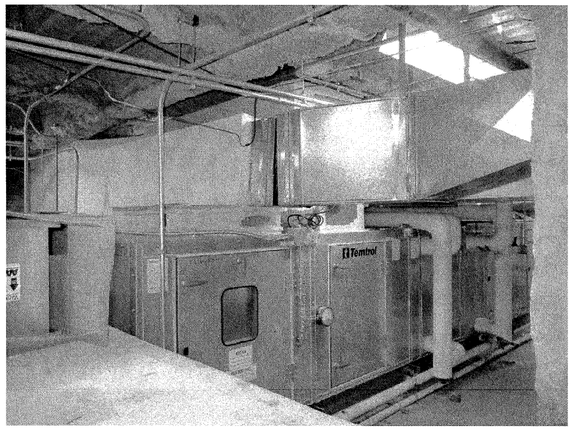
Department of Veterans Affairs

VA FORM 08-6231



B1 EXISTING SITE PHOTO - AHU 17
NOT TO SCALE



B4 EXISTING SITE PHOTO - AHU 17
NOT TO SCALE

NOTES

A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

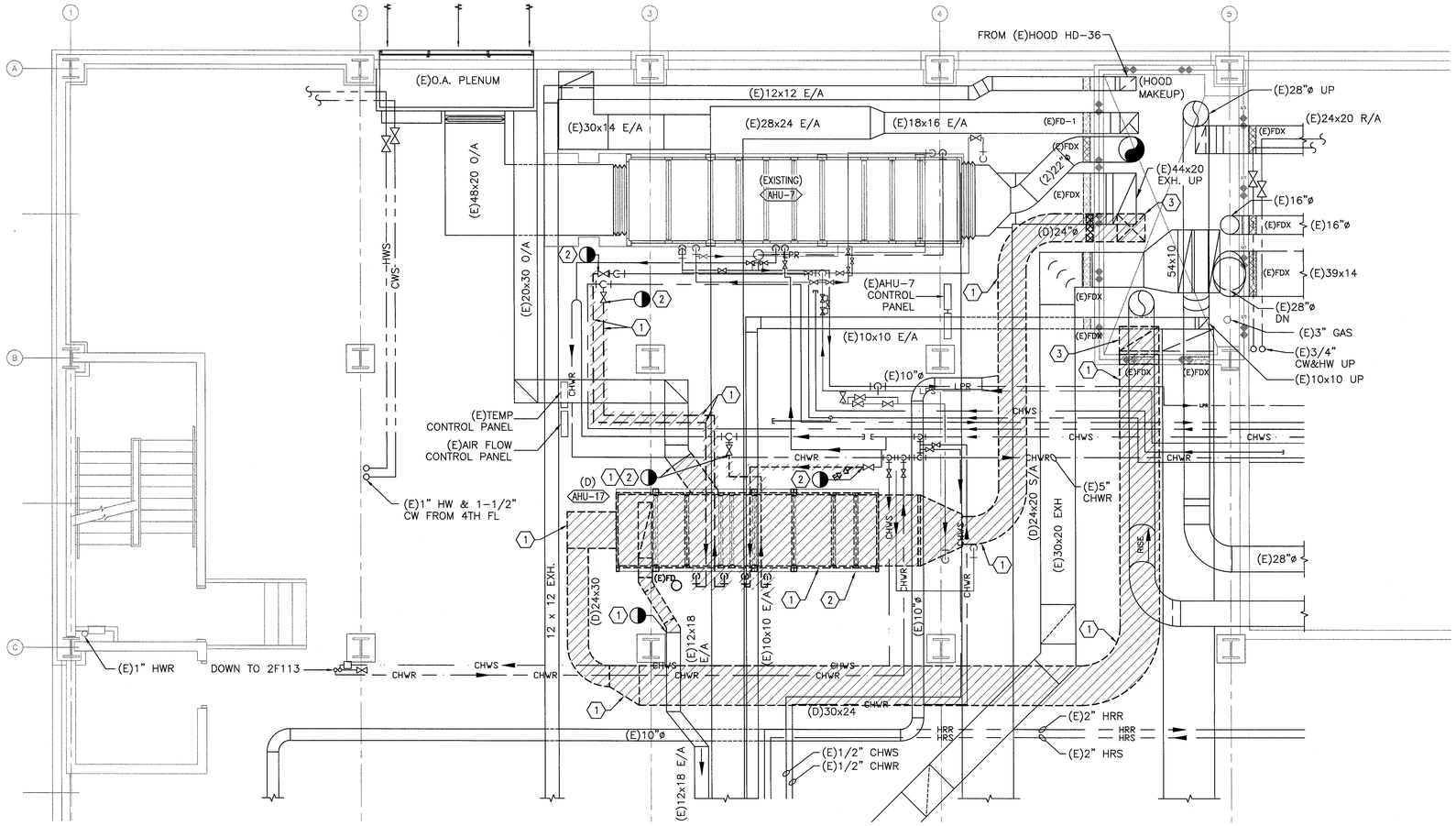
B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

C. REFER TO SHEET MH102 FOR MECHANICAL HVAC NEW WORK.

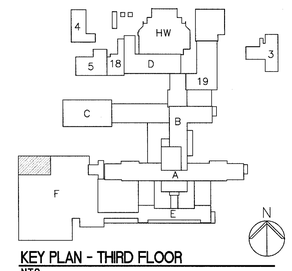
D. REFER TO SHEET MP102 FOR MECHANICAL PIPING NEW WORK.

KEY NOTES

1. REMOVE EXISTING AHU-17 AND ALL DUCTWORK AND PIPING AS INDICATED.
2. EXISTING VALVES TO BE MAINTAINED FOR EXTENSION OF NEW PIPING; REFER TO MP102 FOR DETAILS.
3. REMOVE EXISTING DUCT RISERS FROM THIRD FLOOR MECHANICAL SPACE TO FIRST FLOOR CEILING LEVEL, AND PREP SHAFT SPACE FOR NEW DUCTWORK; REFER TO MH102 FOR DETAILS.
4. EXISTING CONCRETE PAD TO REMAIN AND BE EXTENDED FOR NEW AHU; REFER TO MH102 FOR DETAILS.



F1 PARTIAL THIRD FLOOR PLAN
SCALE 1/4" = 1'-0"



KEY PLAN - THIRD FLOOR
N.T.S.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:
PARADIGM
ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

STATE OF KENTUCKY BLAIRE CASEL VAN GAMBEKE 24,738 LICENSED PROFESSIONAL ENGINEER

Drawing Title: MECHANICAL HVAC AND PIPING DEMOLITION PLAN THIRD FLOOR		Project Title: REMODEL CARDIAC CATH LAB SUITE	Project Number: 635-CS1-102
			Building Number: F
Approved Project Director	Control Number: VA256-13-C-0277	Location: OKLAHOMA CITY VAMC, 921 N.E. 13TH STREET, OKLAHOMA CITY, OK. 73104	Drawing Number: MD102
	PO Number: 635-C35336	Date: 05-21-2015 / Checked: KLP / Drawn: JDM	

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231

NOTES

A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

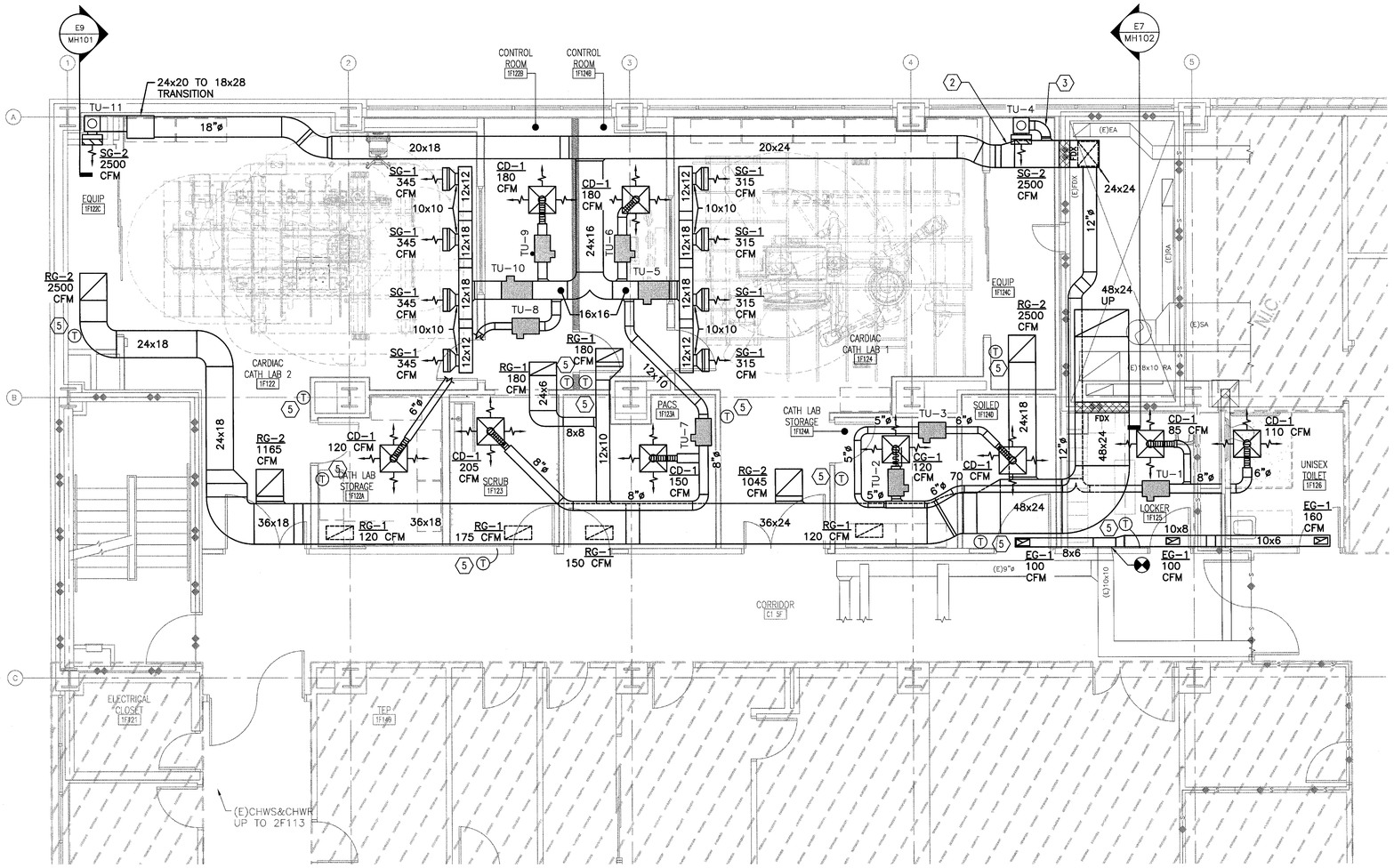
B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

C. REFER TO SHEET MD101 FOR MECHANICAL HVAC DEMOLITION.

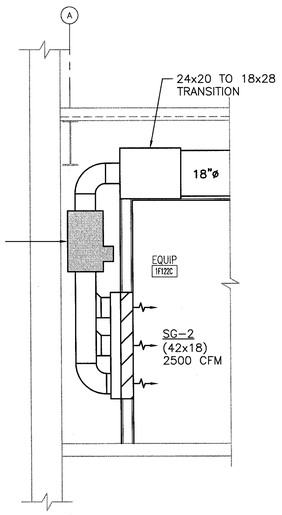
D. REFER TO SHEET MP101 FOR MECHANICAL PIPING NEW WORK.

KEY NOTES

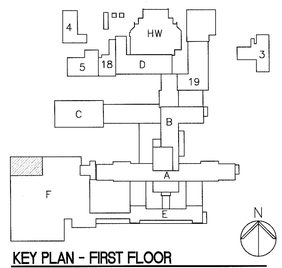
1. CONNECT NEW SUPPLY DUCT (MEDIUM PRESSURE) TO THE EXISTING FIRE DAMPER AT THIS LOCATION.
2. TRANSITION FROM 24x20 AT SHAFT TO 18x28 DUCT TO AVOID STRUCTURAL SUPPORTS.
3. TI-IN NEW TU-4 AND THEM TURN DOWN INTO CAVITY AREA, AND ATTACH TO NEW SUPPLY GRILLE.
4. INSTALL NEW 12"ø SUPPLY FIRE DAMPER AND NEW 48x24 RETURN FIRE DAMPER. COORDINATE TO MAINTAIN CEILING HEIGHT AND ACCESS.
5. NEW THERMOSTAT LOCATION.



F1 PARTIAL FIRST FLOOR PLAN
SCALE 1/4" = 1'-0"



E9 SECTION
SCALE 1/2" = 1'-0"



KEY PLAN - FIRST FLOOR
N.T.S.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

PARADIGM
ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

BLAIRE CASSEL IVAN CARBERRY 34,708 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY

Drawing Title: MECHANICAL HVAC PLAN FIRST FLOOR		Project Title: REMODEL CARDIAC CATH LAB SUITE	Project Number: 635-CS1-102
Approved Project Director	Control Number: VA256-13-C-0277	Location: OKLAHOMA CITY VAMC 921 NE 15TH STREET, OKLAHOMA CITY, OK 73104	Building Number: F
	PO Number: 635-C35336	Date: 05-21-2015 / Checked: KLP / Drawn: JDM	Drawing Number: MH101

Office of Construction and Facilities Management
Department of Veterans Affairs

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KEY NOTES

1. INSTALL NEW AHU-17 AS INDICATED.
2. ROUTE NEW SUPPLY DUCT FROM AHU-17 TO SHAFT AND DOWN TO FIRST FLOOR.
3. 2.ROUTE NEW RETURN DUCT FROM AHU-17 TO SHAFT AND DOWN TO FIRST FLOOR.
4. NEW FIRE DAMPER IN SHAFT WALL.
5. OFFSET DUCT AS INDICATED AND REQUIRED TO COORDINATE WITH EXISTING UTILITIES IN SHAFT.
6. CONNECT NEW OUTSIDE AIR DUCT TO EXISTING. EXTEND TO AHU-17.
7. CONNECT NEW RELIEF AIR DUCT TO EXISTING. EXTEND TO AHU-17.
8. NEW AHU-17 CONTROL PANEL LOCATION.
9. EXISTING CONCRETE HOUSEKEEPING PAD TO BE EXTENDED AS SHOWN. MATCH EXISTING THICKNESS AND EXTEND TO ALIGN WITH NEW AHU-17; REFER TO SPECIFICATION SECTION 03 30 53, CAST-IN PLACE CONCRETE.

NOTES

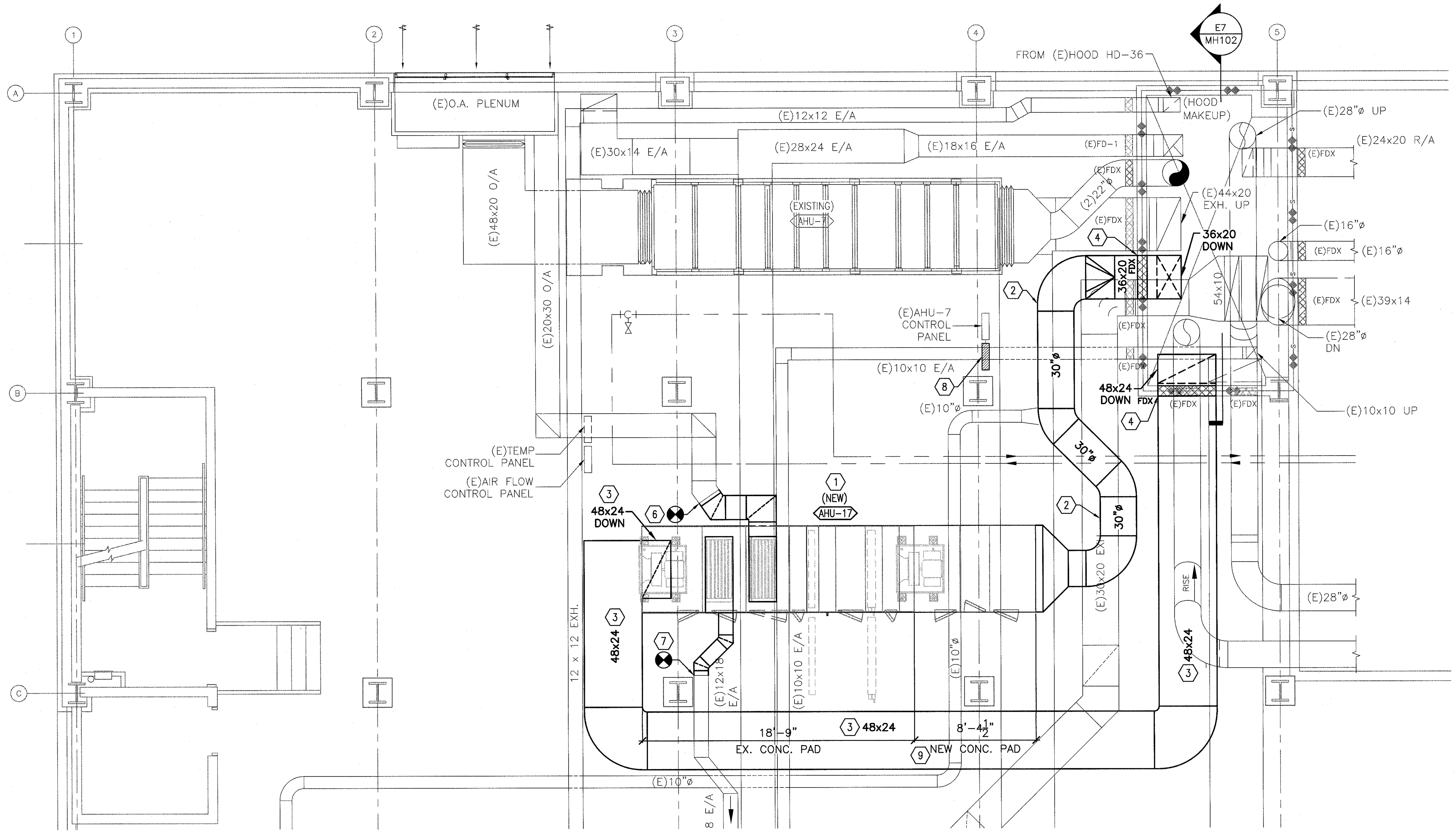
A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

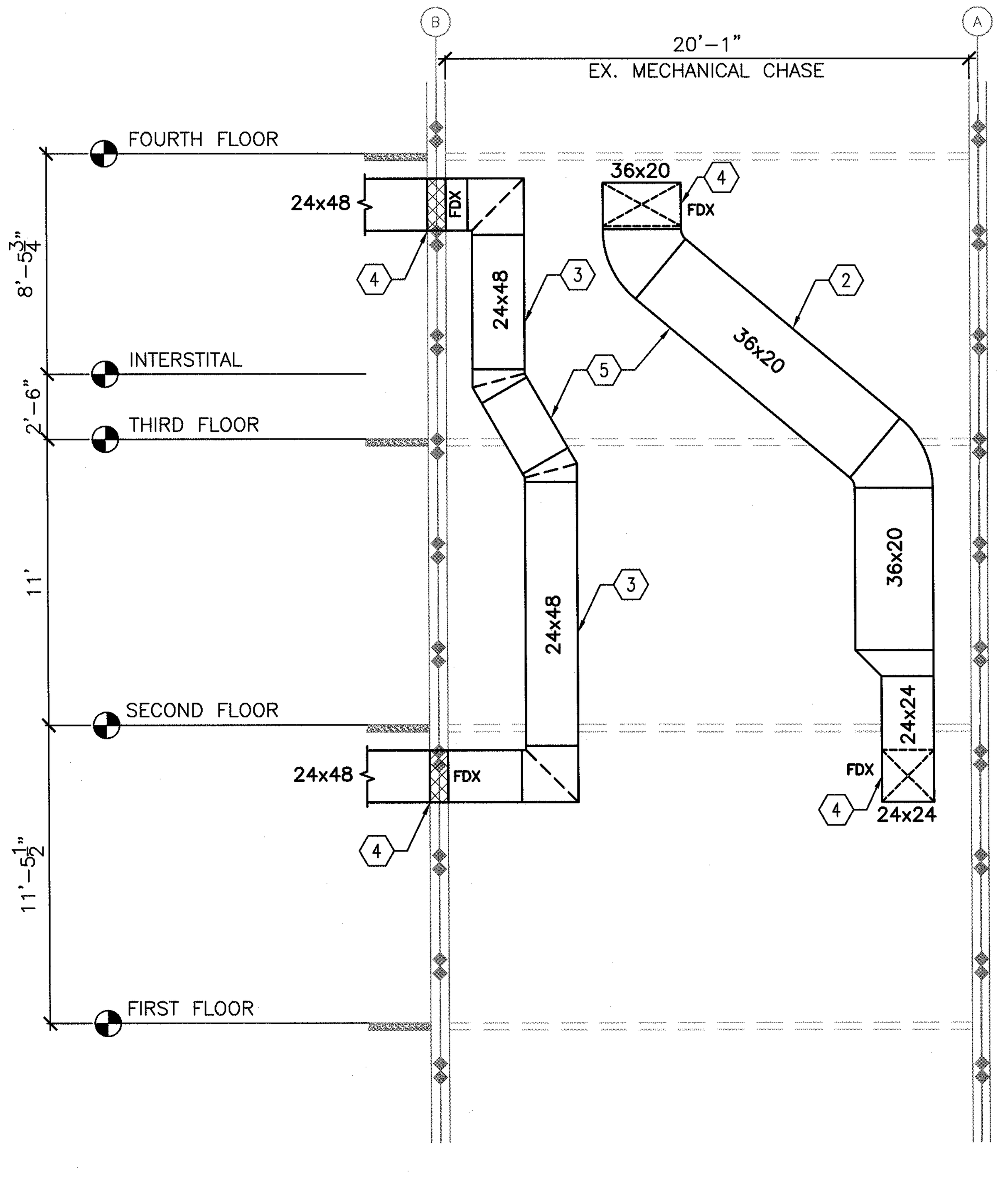
C. REFER TO SHEET MD102 FOR MECHANICAL HVAC AND PIPING DEMOLITION WORK.

D. REFER TO SHEET MP102 FOR MECHANICAL PIPING NEW WORK.

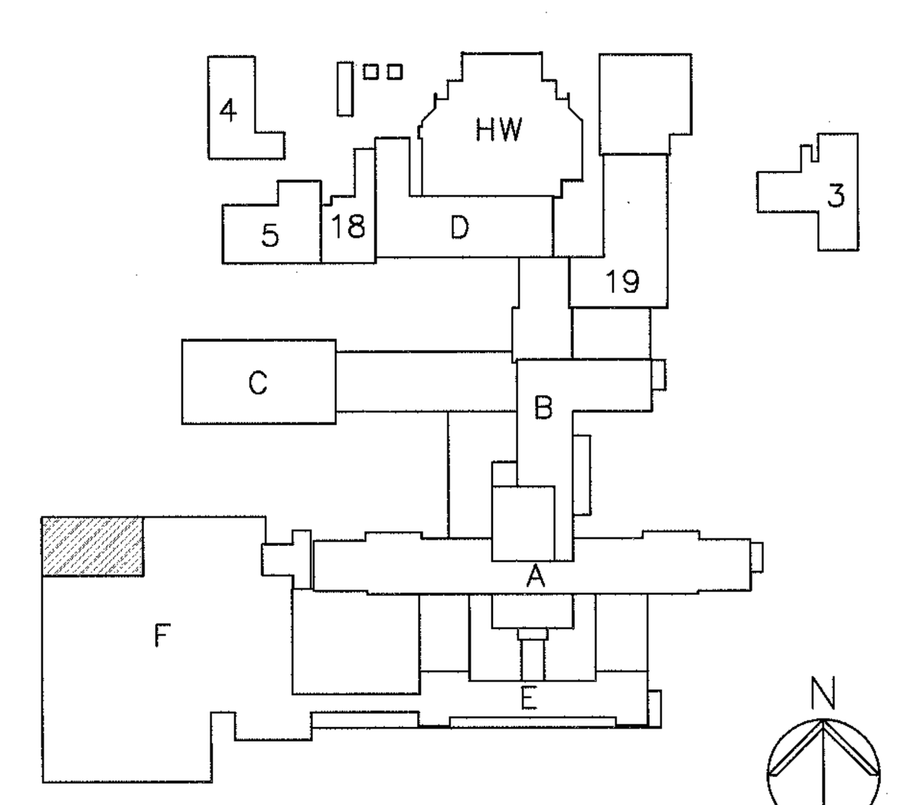
E. REFER TO MH101 AND MP101 FOR FIRST FLOOR MECHANICAL HVAC AND PIPING NEW WORK.



F1 PARTIAL THIRD FLOOR PLAN
SCALE 1/4" = 1'-0"



E7 SECTION - EXISTING CHASE
SCALE 1/4" = 1'-0"



KEY PLAN - THIRD FLOOR
N.T.S.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

CONSULTANTS:	
ARCHITECT/ENGINEERS:	PARADIGM ENGINEERS AND CONSTRUCTORS, 200 Envoy Circle #201, Louisville KY 40299 - PH: 502.339.8511 - www.paradigmusa.com
Drawing Title	MECHANICAL HVAC DEMOLITION PLAN THIRD FLOOR
Project Title	REMODEL CARDIAC CATH LAB SUITE
Project Number	635-CS1-102
Building Number	F
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Location	OKLAHOMA CITY VAMC, 921 N.E. 13TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Drawing Number	MH102

Office of Construction and Facilities Management
Department of Veterans Affairs

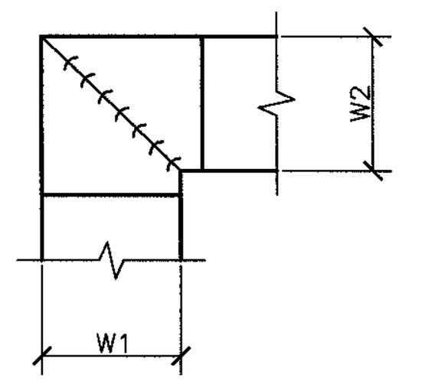
Revisions | Date

VA FORM 08-6231

NOTES

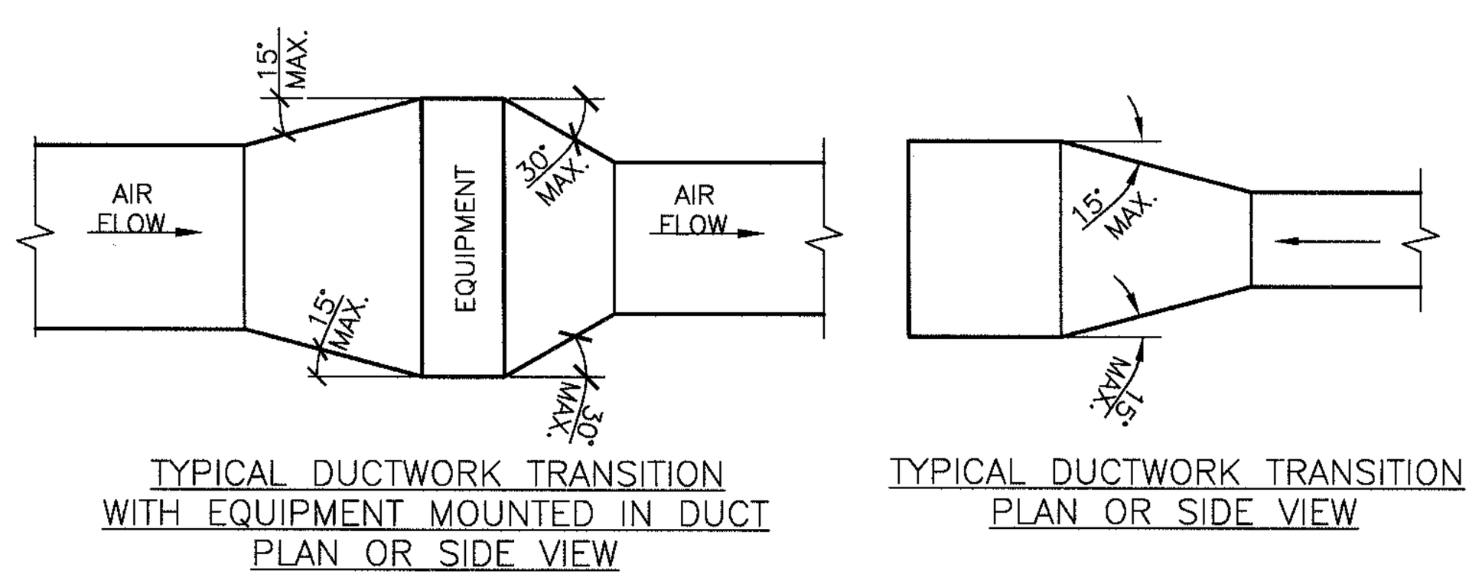
A. REFER TO DWG. M-001 FOR LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.



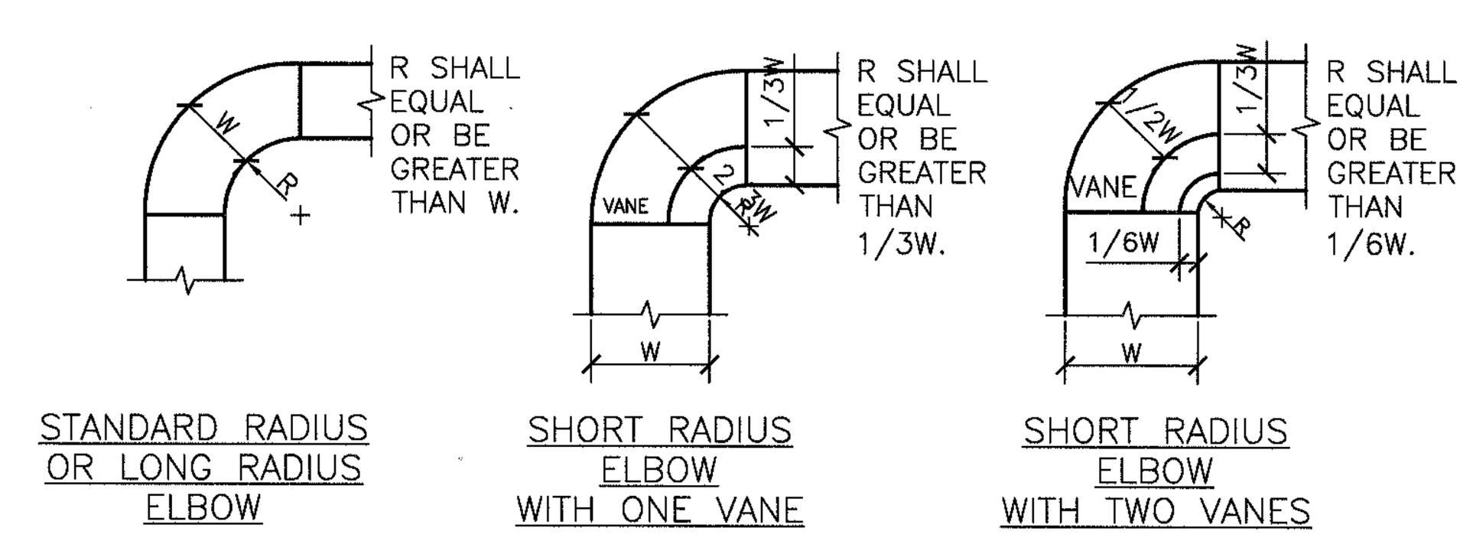
NOTE:
1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1 1/2" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" VANES SHALL BE DOUBLE VANE TYPE.

B1 DUCTWORK SQUARE VANE ELBOWS
NOT TO SCALE



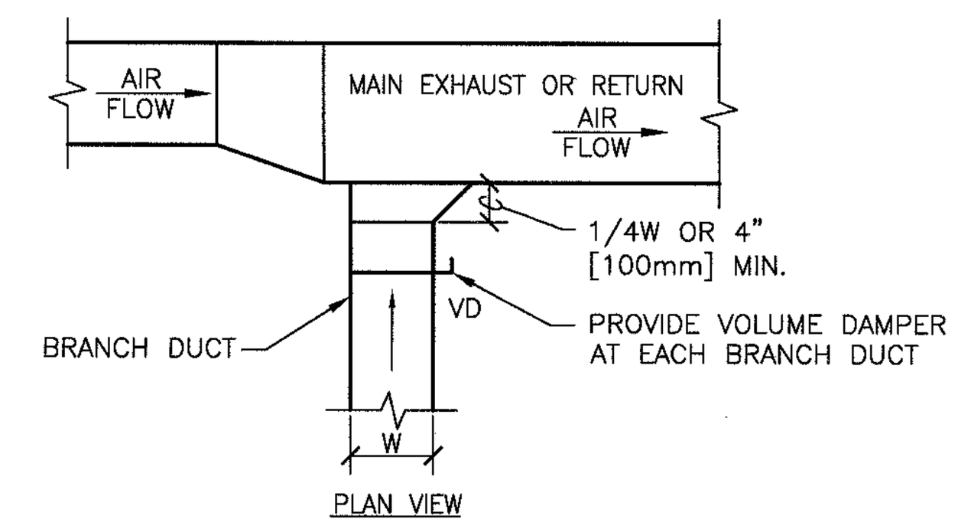
NOTE:
1. UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

B2 DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT)
NOT TO SCALE

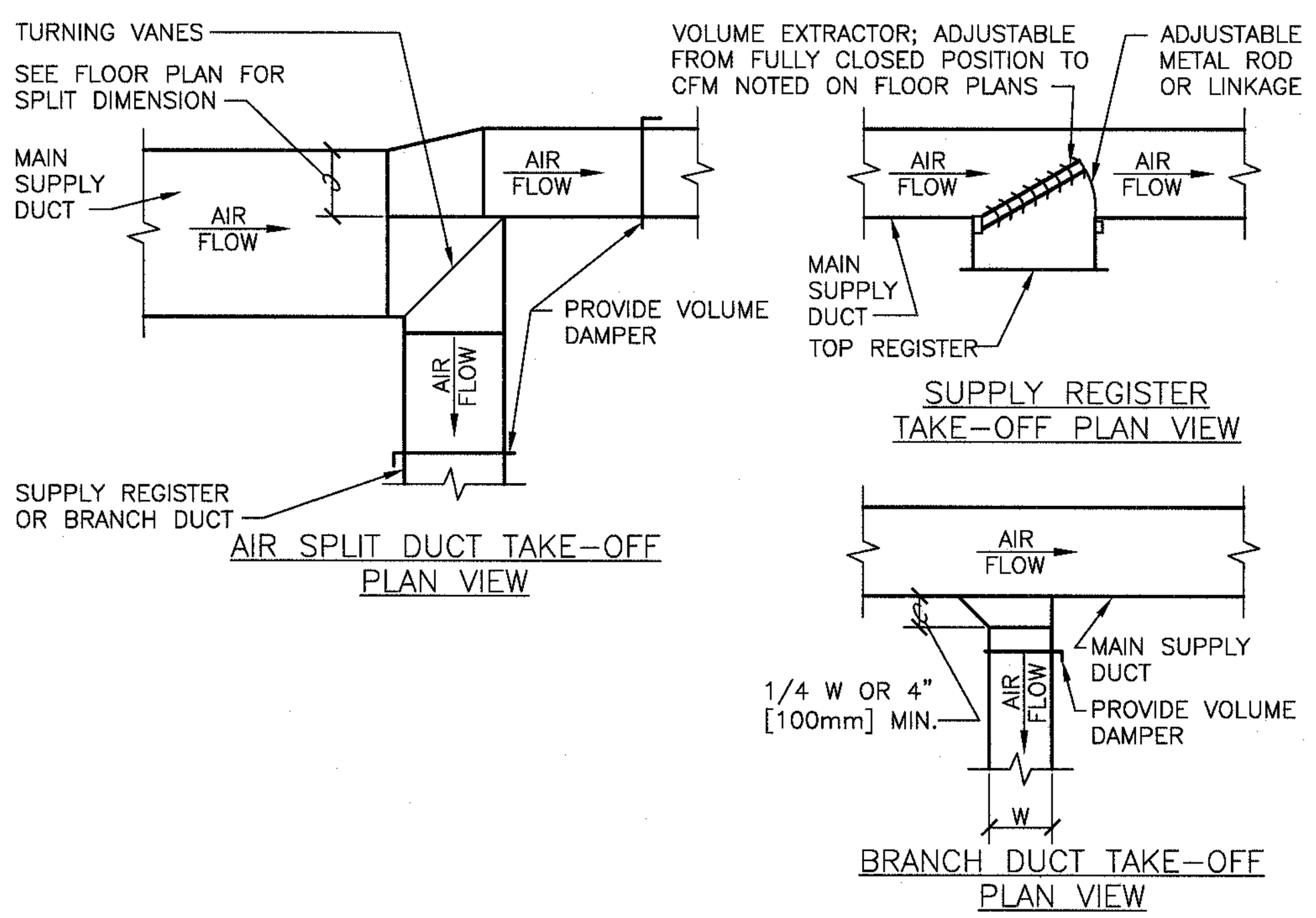


NOTE:
1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

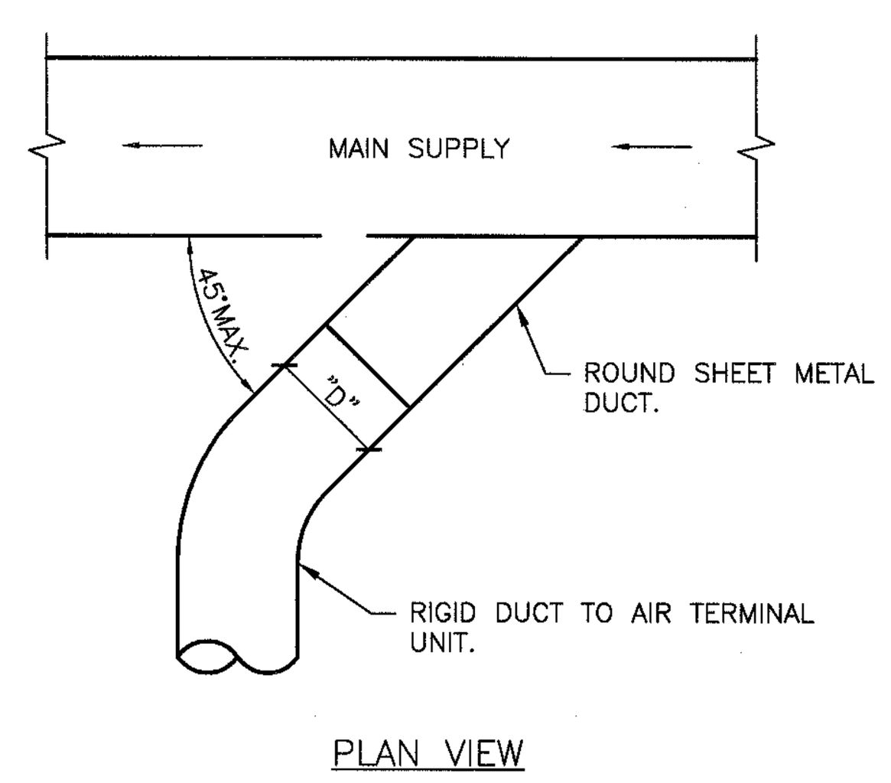
B4 DUCTWORK RADIUS ELBOWS
NOT TO SCALE



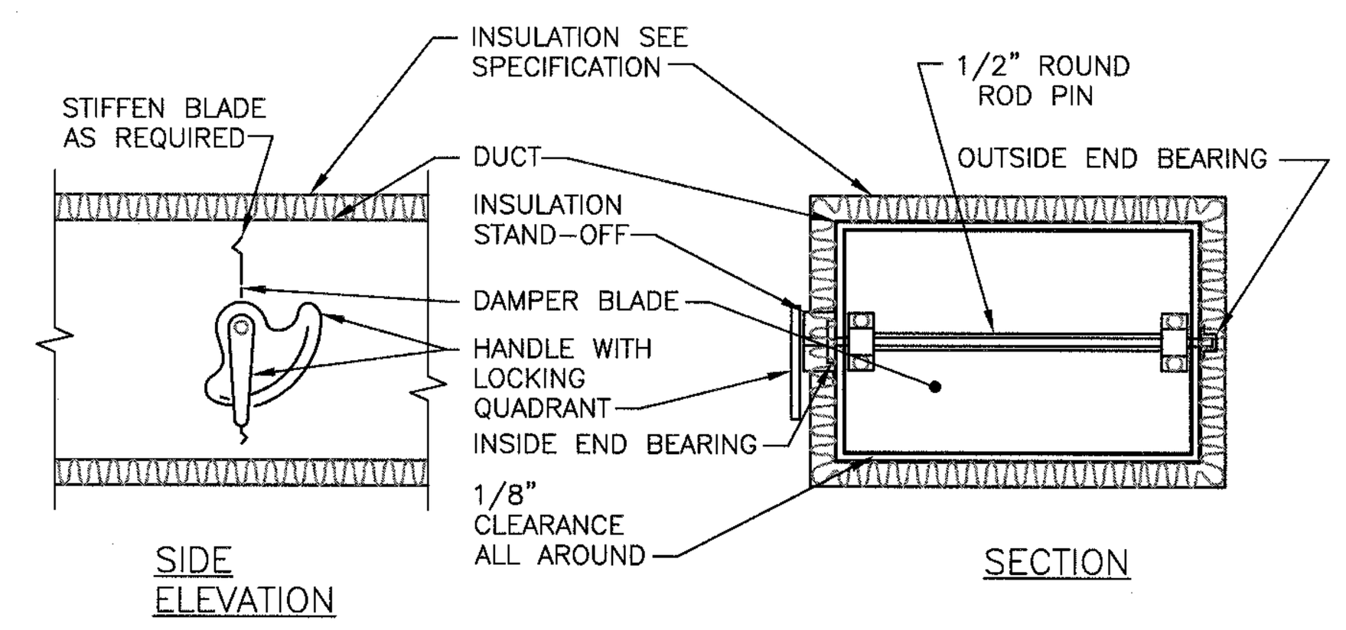
B6 EXHAUST OR RETURN BRANCH DUCTWORK
NOT TO SCALE



C1 SUPPLY DUCTWORK TAKE-OFFS
NOT TO SCALE

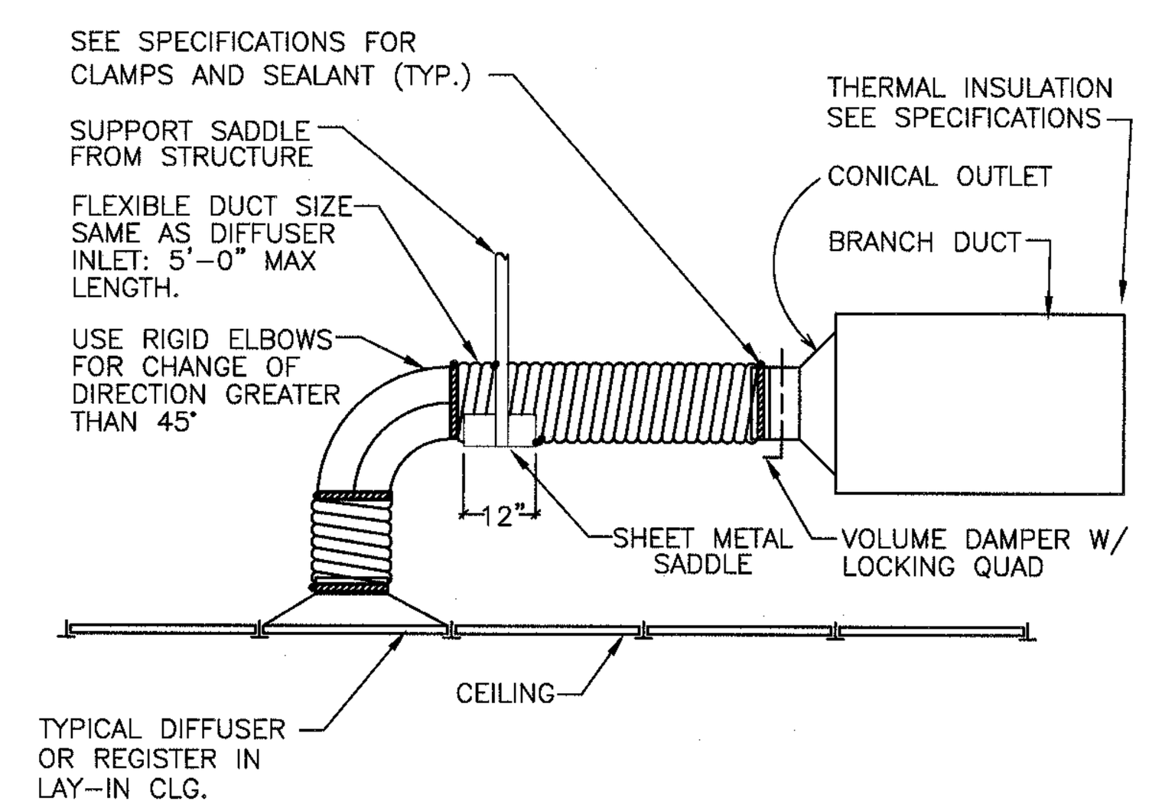


C2 SUPPLY DUCT TAKEOFF - AIR TERMINAL UNIT
NOT TO SCALE

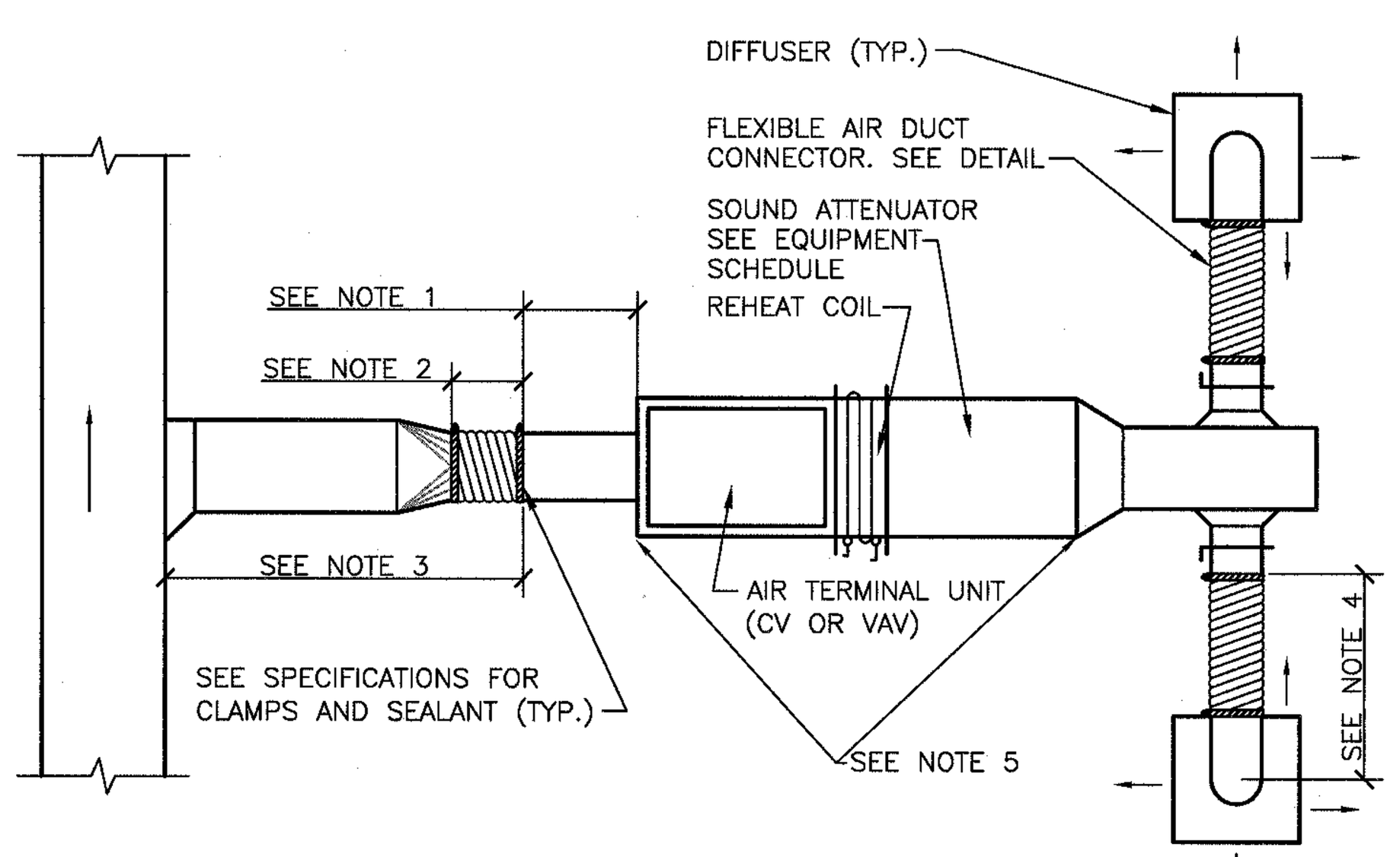


NOTE:
1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

C4 VOLUME DAMPER DETAIL
NOT TO SCALE

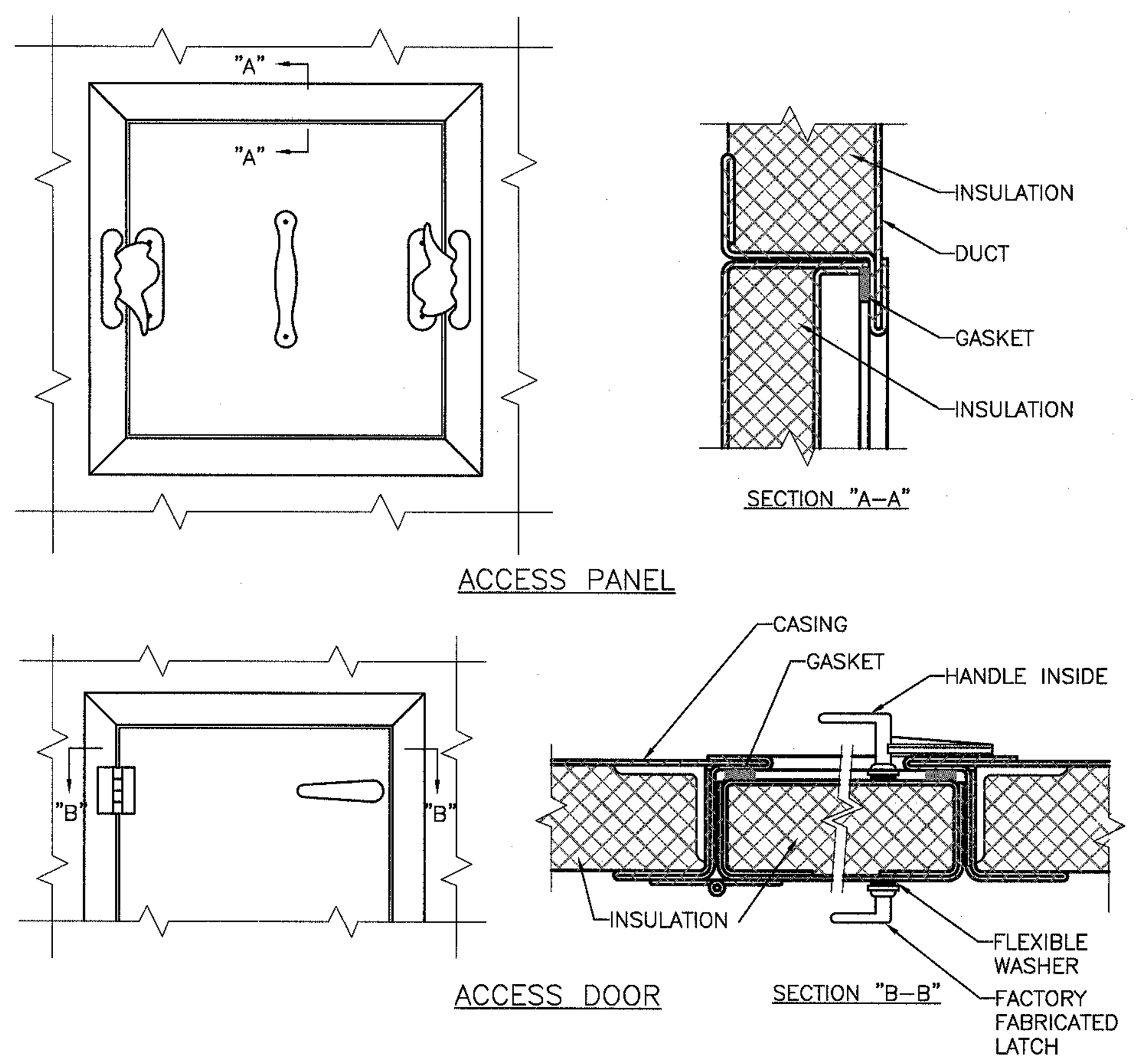


C6 FLEXIBLE AIR DUCT CONNECTOR
NOT TO SCALE



NOTE:
1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A
2. MINIMUM OF 3 TIMES THE DIAMETER OF INLET
3. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'-0".
4. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100'.
5. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'-0". USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
6. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE
7. INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.
8. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

F1 DUCT CONNECTIONS - AIR TERMINAL UNITS
NOT TO SCALE



NOTES:
1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9-15

F2 ACCESS PANEL AND DOOR DETAIL
NOT TO SCALE

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

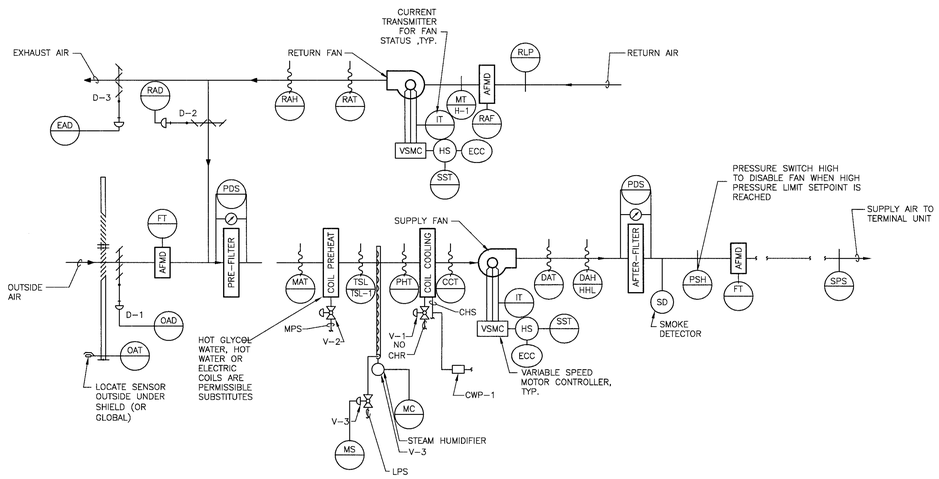
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:
PARADIGM ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

Drawing Title	Project Title	Project Number	
MECHANICAL DETAILS	REMODEL CARDIAC CATH LAB SUITE	635-CSI-102	Office of Construction and Facilities Management
Approved Project Director / Control Number VA256-13-C-0277 / PO Number 635-C35336	Location OKLAHOMA CITY VAMC, 921 N.E. 13TH STREET, OKLAHOMA CITY, OK 73104	Building Number F	
	Date 05-21-2015 / Checked KLP / Drawn JDM	Drawing Number MH501	Department of Veterans Affairs

VA FORM 08-6231



C1 VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM
NOT TO SCALE

JOB: OKLAHOMA CITY VAMC			POINT LEGEND	SYSTEM OUTPUTS		SYSTEM INPUTS			SYSTEM SOFTWARE/CONTROL			PAGE:
BUILDING: 1				BINARY	ANALOG	BINARY	ANALOG		ALARM PROCESSING	APPLICATION/FUNCTION		
SYSTEM: VAV AIR HANDLER SYSTEM COMPONENT:	POINT ID	ABBREVIATION	EMERGENCY/FIRE ALARM/E-MO OPERATION	SUPPLY FAN START/STOP	RETURN FAN START/STOP	SMOKE DETECTOR	STEAM HUMIDIFIER VALVE	SUPPLY FAN VARIABLE SPEED CONTROL	RETURN FAN VARIABLE SPEED CONTROL	TEMPERATURE SETPOINT ADJUSTMENT	TEMPERATURE RESET	HUMIDITY SETPOINT ADJUSTMENT	HUMIDITY RESET	SUPPLY AIR TEMPERATURE	RETURN AIR TEMPERATURE	SUPPLY AIR HUMIDITY	RETURN AIR HUMIDITY	SUPPLY AIR FLOW	OUTSIDE AIR FLOW	SUPPLY AIR STATIC PRESSURE	DISCHARGE AIR STATIC PRESSURE	REMARKS
RETURN AIR TEMPERATURE	AI-1	RAT													●							
RETURN AIR HUMIDITY	AI-2	RAH														●						
RETURN AIR FLOW (CFM)	AI-3	RAF																●				
MIXED AIR TEMPERATURE	AI-4	MAT													●							
PRE-HEAT TEMPERATURE	AI-5	PHT													●							
COOILING COIL TEMPERATURE	AI-6	CCT																●				
DISCHARGE AIR TEMPERATURE	AI-7	DAT													●							
DISCHARGE STATIC PRESSURE	AI-8	DASP																			●	
DISCHARGE AIR HUMIDITY	AI-9	DAH															●					
SUPPLY AIR FLOW (CFM)	AI-10	SAF																●				
OUTSIDE AIR TEMPERATURE	AI-11	OAT													●							
RETURN LOW PRESSURE	BI-1	RLP																				
RETURN FAN STATUS	BI-2	RF-STS			●																	
SUPPLY FAN STATUS	BI-3	SF-STS		●																		
MIXED AIR LOW LIMIT	BI-4	TSL-1																				
STATIC PRESSURE	BI-5	SPS																				
HUMIDITY HIGH LIMIT	BI-6	HHL																				
SUPPLY FAN VSMC ALARM	BI-7	SF-ALA																				
RETURN FAN VSMC ALARM	BI-8	RF-ALA																				
RETURN FAN VSMC	AO-1	RF-SPD																				FULL COMMUNICATION
SUPPLY FAN VSMC	AO-2	SF-SPD																				FULL COMMUNICATION
OUTSIDE AIR DAMPER	AO-3	OAD D-1																				
RETURN AIR DAMPER	AO-4	RAD D-2																				
EXHAUST AIR DAMPER	AO-5	EAD D-3																				
PRE-HEAT VALVE V-2	AO-6	PHT-V1																				
COILING VALVE V-1	AO-7	CLG-V1																				
STEAM HUMIDIFIER VALVE V-4	AO-8	HUM-V4																				
RETURN FAN START/STOP	BO-1	RF-SST	●																			
SUPPLY FAN START/STOP	BO-2	SF-SST	●																			
STEAM ISOLATION VALVE V-3	BO-3	HUM-ISO-V3	●																			
SMOKE DETECTOR	BO-4	SD	●																			
PUMP START/STOP	BO-5	CWP-17 S/S	●																			

C4 POINTS LIST FOR VAV AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR
NOT TO SCALE

NOTES

A. REFER TO DWG. M-001 FOR LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

SEQUENCE OF OPERATION
VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR (NO 100% ECONOMIZER)

1. GENERAL
   1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D-1, D-3, SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1, D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL
   2.1 SUPPLY AIR TEMPERATURE, SENSED BY DAT, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL BY MODULATING V-1 WITH D-1 AND D-3 OR V-2 IN SEQUENCE.

   2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY OAT, IS ABOVE 75°F (ADJ), THE DIGITAL CONTROL PANEL SHALL PREVENT THE MODULATION OF D-1, D-2, AND D-3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION. THE DIGITAL CONTROL PANEL SHALL START CWP-17 AND MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY DAT.

   2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY OAT, IS BETWEEN 65°F AND THE SUPPLY AIR TEMPERATURE SENSED BY DAT, DAMPER D-2 SHALL RETURN TO MINIMUM SETTING AND D1 AND D3 SHALL BE FULLY OPEN (MAXIMUM OUTSIDE AIR POSITION). THE DIGITAL CONTROL PANEL SHALL START CWP-17 AND MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY DAT.

   2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY OAT, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY DAT, THE DCP SHALL STOP CWP-17 AND DAMPERS D1, D-2 AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-2 IS OPEN AND D-3 IS CLOSED TO MINIMUM OUTSIDE AIR, V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY DAT.

   2.5 WHEN THE TEMPERATURES SENSOR MAT IS LESS THAN 55°F, V-2 SHALL MODULATE TO MAINTAIN TEMPERATURE, SENSED BY PHT, TO A SETPOINT OF 55°F.

   2.6 ON AHU SHUTDOWN, MODULATE V-2 TO MAINTAIN A 50°F CABINET TEMPERATURE, AS SENSED BY PHT AND START CWP-17.

3. AIR FLOW CONTROL
   3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 2.0" OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE), SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL ATU (WHERE APPLICABLE).

   3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RETURN AIR FAN VSMC TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.

   3.3 USING PRESSURE SENSOR SPS-2 SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS DOES EXCEED 3" THE SUPPLY AIR FAN SHALL STOP.

4. HUMIDITY CONTROL
   4.1 WHEN THE DIGITAL CONTROL PANEL IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY RAH, 2-WAY "ON-OFF" CONTROL VALVE V-3 SHALL REMAIN CLOSED. WHEN THE DIGITAL CONTROL PANEL IS CALLING FOR HUMIDITY, V-3 SHALL REMAIN OPEN.

   4.2 RETURN AIR HUMIDITY SHALL BE MAINTAINED AT SETPOINT OF 35% RH (ADJ) VIA DIGITAL CONTROL PANEL BY MODULATING CONTROL VALVE V-4 TO MAINTAIN THE DESIRED HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN HUMIDITY OF 80% AS SENSED BY HHL. DCP SHALL CLOSE VALVE V-3 WHENEVER THE SUPPLY FAN IS OFF. VALVE V-4 SHALL BE INTERLOCKED WITH A TEMPERATURE SWITCH TO KEEP THE HUMIDIFIER OFF UNTIL CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE.

5. FREEZE PROTECTION
   5.1 IF THE AIR TEMPERATURE AS SENSED BY PHT FALLS BELOW 45°F, AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F, AS SENSED BY PHT, THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN VSD AND UNIT SHALL BE SHUTDOWN IN HAND,AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. AUTOMATIC SHUTDOWN/RESTART
   6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM.

   6.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

7. EMERGENCY CONSTANT SPEED OPERATION
   7.1 UPON FAILURE OF THE VSMC, THE SUPPLY AND RETURN FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions	Date

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BLAINE CARROL VAN GAMBEKE 34,728 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY

Drawing Title: MECHANICAL HVAC CONTROL DETAILS	Project Title: REMODEL CARDIAC CATH LAB SUITE	Project Number: 635-CS1-102	Office of Construction and Facilities Management
Approved Project Director	Control Number: VA256-13-C-0277	Building Number: F	
	PO Number: 635-C35336	Location: OKLAHOMA CITY VAMC, 921 NE 13TH STREET, OKLAHOMA CITY, OK 73104	Drawing Number: MH502
		Date: 05-21-2015 / Checked: KLP / Drawn: JDM	Department of Veterans Affairs

VA FORM 08-6231

three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot

AIR HANDLING UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	AIR FLOW	AIR FLOW SUPPLY CFM	AIR FLOW MIN OA CFM	AIR FLOW RETURN CFM	SUPPLY FAN MARK	RETURN OR RELIEF FAN MARK	EXHAUST FAN MARK	PREFILTER MARK	AFTER FILTER MARK	FINAL FILTER MARK	HEAT RECOVERY MARK	PREHEAT COIL MARK	CHILLED WATER COIL MARK	REDUNDANT COOLING COIL MARK	HUMIDIFIER MARK	WEIGHT (LBS)	REMARKS
AHU-17	3RD FLOOR	CATH LAB	INDOOR	VAV	8,830	1700	7130	SF-17	RF-17	–	PF-17	–	FF-17	–	HC-17	CC-17	–	SH-17	4,507	

NOTES:

1. BASIS OF DESIGN IS TRANE.
2. SOUND POWER (125HZ 8000): (RETURN) 83dB, 91dB, 91dB, 81dB, 80dB, 79dB, 74dB (SUPPLY) 77dB, 73dB, 73dB, 69dB, 63dB, 59dB, 53dB.

FAN SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW CFM	TSP IN. W.C.	FAN: FAN	FAN: WHEEL	FAN: CLASS	FAN: ARRANGEMENT, ROTATION, AND DISCHARGE	FAN: DIAMETER IN	FAN: MIN. % EFF	FAN: DRIVE	FAN: FAN MAX. RPM	MOTOR ELECTRICAL: NOMINAL POWER BHP	MOTOR ELECTRICAL: NOMINAL POWER HP	MOTOR ELECTRICAL: PHASE	MOTOR ELECTRICAL: VOLT	MOTOR ELECTRICAL: RPM	MOTOR ELECTRICAL: SPEED CONTROL	CONTROL SEQUENCE	REMARKS
SF-17	3RD FLOOR	CATH LAB	SUPPLY	8,830	4.6	FC	10	–		10	75	DIRECT	1985	4.95	5.0	3	460	1,800	VSD	MH502	
RF-17	3RD FLOOR	CATH LAB	RETURN	8,830	2.0	FC	22.5	–	PLENUM	22.5	75	DIRECT	2184	7.2	7.5	3	460	1800	VSD	MH502	

ROOM AIR BALANCE SCHEDULE (AHU-2) PARTIAL

ROOM NO.	ROOM NAME	ROOM S.F.	INDIVIDUAL ROOM TEMP. CONTROL	SUPPLY: ROOM AIR FLOW CFM	SUPPLY: ROOM AIR FLOW AC	SUPPLY: # OF AIR DEVICES	SUPPLY: AIR DEVICE MARK	SUPPLY: SUPPLY FAN	RETURN: RETURN OR EXHAUST [R/E]	RETURN: ROOM AIR FLOW CFM	RETURN: # OF DEVICES	RETURN: AIR DEVICE MARK	RETURN: RETURN OR EXHAUST FAN	ROOM AIR FLOW CV	ROOM AIR FLOW VAV	ROOM AIR BALANCE	NET INFILTRATION CFM	NET EXFILTRATION CFM	REMARKS
1F122	CARDIAC CATH LAB 2	608	Y	1380	15/3				R	1165				X		+		205	
1F122A	CATH LAB STORAGE	101	N	120	4/–				R	120				X		0			
1F122B	CONTROL ROOM	131	Y	180	6/2				R	180					X	0			
1F122C	EQUIPMENT	47	Y	2500	6/2				R	2500					X	0			
1F123	SCRUB	91	N	205	15/3				R	175				X		+		30	
1F123A	PACS	120	N	150	6/2				R	150					X	0			
1F124	CARDIAC CATH LAB 1	546	Y	1230	15/3				R	1045				X		+		185	
1F124A	CATH LAB STORAGE	87	N	120	4/–				R	120				X		0			
1F124B	CONTROL ROOM	122	Y	180	6/2				R	180					X	0			
1F124C	EQUIPMENT	98	Y	2500	6/2				R	2500					X	0			
1F124D	SOILED	78	Y	70	6/–				E	100				X		––	30		
1F125	LOCKER	95	N	85	6/–				E	100				X		–	15		
1F126	UNISEX TOILET	106	N	110	10/–				E	160				X		––	50		
			TOTAL CFM	8830					TOTAL CFM	8495						TOTAL CFM	95	420	* AREA IS 325CFM POSITIVE

SINGLE DUCT AIR TERMINAL UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR ROOM SERVED	SYSTEM AIR HANDLING	SIZE	AIR FLOW MIN. CFM	AIR FLOW MAX. CFM	ADDITIONAL SOUND ATTINUATION REQUIRED	CONTROL TYPE	CONTROL SEQUENCE	REHEAT HW	REHEAT ELEC	REHEAT NONE	PERIMETER SUPPLEMENTAL HEAT LINK	REMARKS (EXISTING CFM)
TU-1	1F125	LOCKER/TOILET	AHU-17	SEE BELOW	245	245	NO	DDC	RH	X				
TU-2	1F124A	STORAGE	AHU-17	SEE BELOW	120	120	NO	DDC	RH	X				
TU-3	1F124A	SOILED	AHU-17	SEE BELOW	70	70	NO	DDC	RH	X				
TU-4	1F124C	EQUIPMENT 1	AHU-17	SEE BELOW	400	2500	NO	DDC	RH	X				
TU-5	1F124B	CATH LAB 1	AHU-17	SEE BELOW	1230	1230	NO	DDC	RH	X				
TU-6	1F124B	CONTROL 1	AHU-17	SEE BELOW	60	180	NO	DDC	RH	X				
TU-7	1F124B	PACS	AHU-17	SEE BELOW	40	150	NO	DDC	RH	X				
TU-8	1F122B	STORAGE	AHU-17	SEE BELOW	120	120	NO	DDC	RH	X				
TU-9	1F122B	CONTROL 2	AHU-17	SEE BELOW	60	180	NO	DDC	RH	X				
TU-10	1F122B	CATH LAB 2	AHU-17	SEE BELOW	1380	1380	NO	DDC	RH	X				
TU-11	IF122C	EQUIPMENT 2	AHU-17	SEE BELOW	400	2500	NO	DDC	RH	X				

NOTES:

1. WHERE NEW UNIT IS CALLED FOR, SIZE UNIT BASED ON "AIR TERMINAL UNIT SIZING SCHEDULE."

AIR TERMINAL UNIT SIZING SCHEDULE

SIZE	MIN. ALLOWABLE AIR FLOW CFM	MAX. ALLOWABLE AIR FLOW CFM	DUCT INLET SIZE IN	MAX APD IN WG	MAXIMUM SOUND POWER LEVEL (RE: 10-12 WATTS) FOR BOX DISCHARGE AT MAXIMUM INLET DUCT — OCTAVE BANDS 2	3	4	5	6	7	HOT WATER HEATING COIL: EAT °F	EWT °F	FLOW GPM	MAX WPD FT	PIPE RUNOUT SIZE TO COIL IN	REMARKS
A	60	170	4	0.4	69	65	58	52	51	47	55	140	0.5	3	0.75	
B	90	260	5	0.4	69	63	59	52	51	47	55	140	0.5	3	0.75	
C	130	380	6	0.4	69	67	61	55	52	49	55	140	0.7	4	0.75	
D	160	490	7	0.4	70	68	63	57	53	49	55	140	0.7	4	0.75	
E	230	680	8	0.4	71	68	59	53	51	47	55	140	1.0	3	0.75	
F	270	790	9	0.4	71	69	60	54	51	47	55	140	1.5	4	0.75	
G	350	1050	10	0.4	74	68	61	57	54	52	55	140	1.5	4	0.75	
H	500	1500	12	0.4	73	69	64	59	57	53	55	140	2.5	3	0.75	
I	750	2250	14	0.4	73	68	65	61	61	59	55	140	3.5	4	0.75	
J	1000	3000	16	0.4	73	68	66	60	58	55	55	140	4.5	4	1.0	

NOTES:

1. INLET STATIC BASED ON ARI 885-98.
2. THIS SCHEDULE IS USED WITH THE TERMINAL UNIT SCHEDULE
3. CONTROL SEQUENCE SHALL BE AS INDICATED ON THE AIR TERMINAL UNIT SCHEDULE.
4. PROVIDE SOUND ATTENUATION AFTER-SECTION AS REQUIRED TO MEET ROOM NC LEVEL.

DESIGNER NOTE

1. AIR TERMINAL UNIT SELECTION IS TO BE BASED UPON A MAXIMUM UNIT DISCHARGE NOISE CRITERIA (NC) VALUE OF 27. UNIT DISCHARGE SOUND POWER LEVELS ARE BASED UPON A 1.55 IN W.G. [386 Pa] INLET STATIC PRESSURE. THE DESIGNER SHALL DESIGN THE DUCT DISTRIBUTION SYSTEM IN SUCH A WAY THAT INLET STATIC PRESSURE DOES NOT EXCEED 1.76 IN. ADDITIONAL SOUND ATTENUATION DOWNSTREAM OF AIR TERMINAL UNIT WILL BE REQUIRED IF ROOM NOISE CRITERIA VALUE MUST BE BELOW 30.

AIR DEVICE SCHEDULE

MARK	TYPE	AIR FLOW MIN. CFM	AIR FLOW MAX. CFM	MAX APD IN WG	MOUNTING	PANEL/FRAME SIZE IN x IN	NECK SIZE IN	NC	DAMPER	FINISH	REMARKS
CD-1	SUPPLY	100	800	0.15	LAY-IN	24 X 24	VARIES	<35	YES	WHITE	
RG-1	RETURN	100	800	0.10	LAY-IN	24 X 12	FULL	<30	YES	WHITE	
RG-2	RETURN	800	3000	0.10	SURFACE	24 X 24	FULL	<30	YES	WHITE	
EG-1	EXHAUST	40	2000	0.15	SURFACE	12 X 8	FULL	<30	YES	WHITE	
SG-1	SUPPLY	300	350	0.08	SURFACE	16 X 10	FULL	<30	YES	WHITE	
SG-2	SUPPLY	2500	2500	0.08	SURFACE	18 X 42	FULL	<40	YES	WHITE	

NOTES

A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

HVAC DESIGN DATA

DESIGN CONDITIONS	SUMMER TEMP °F	SUMMER WET BULB TEMP °F	SUMMER % HUMIDITY	WINTER TEMP °F	WINTER DEWPOINT TEMP °F	WINTER % HUMIDITY	LOWEST AVERAGE ANNUAL DEWPOINT
OKC	99.5	74.1	33.0	11.4	7.7	35	6.8

AIR FILTER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	MERV RATING	AIR FLOW CFM	APD INTIAL IN	APD CHANGEOVER IN	HOUSING TYPE	CARTRIDGES #	CARTRIDGES SIZE IN	CARTRIDGES ARRANGEMENT	REMARKS
PF-17	UNIT	OFFICE	SUPPLY	7		0.2	0.4	FRAME			MANUFACTURER	
	UNIT	OFFICE	SUPPLY	11		0.2	0.6	FRAME			MANUFACTURER	
FF-17	UNIT	PATIENT	SUPPLY	14	8,830	0.58	1.5	FRAME			MANUFACTURER	

STEAM HUMIDIFIER SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	HUMIDIFIER TYPE	AIR FLOW CFM	MINIMUM # OF MANIFOLDS	EAT Db °F	EAT Wb °F	EAT DEWPOINT °F	LAT DEWPOINT °F	SOURCE	STEAM PRESS ENT VALUE PSIG	STEAM PRESS ENT HUMIDIFIER PSIG	STEAM FLOW LBS/HR	CONTROL TYPE	REMARKS
SH-17	3RD FLOOR	AHU-17	STEAM	8,830	2	56				STEAM	12	10	211.2	MODULATING	

CLEAN STEAM GENERATOR SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	SOURCE OF MAKEUP	WATER CONDITIONS FLOW GPM	WATER CONDITIONS EWT °F	PRODUCED STEAM FLOW PSIG	PRODUCED STEAM PRESS PSIG	STEAM PRESSURE ENT CONTROL VALVE PSIG	STEAM PRESSURE ENT HEAT EXCHANGER PSIG	CONTROL VALVE LBS/HR	TRAP: TRAP No.	TRAP: # TRAPS	TRAP: CAPACITY EACH LBS/HR	REMARKS
CS-17	3RD FLOOR	CATH LAB	AHU-17		CW	0.5	50	15	15	12	12	211.2	1-TP-17B	1	211.2	NOTE 1

NOTES:

1. BASED ON DRI-STEAM MODEL STS-50-C.

STEAM HEATING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	APPLICATION	AIR FLOW CFM	MAX. FACE VELOCITY FPM	APD IN WG	TEMPERATURE EAT °F	TEMPERATURE LAT °F	TOTAL MIN. CAPACITY MBH	STEAM ENT CONT VALUE PSIG	STEAM ENT COIL PSIG	STEAM FLOW LBS/HR	STEAM TRAP MARK	STEAM TRAP LBS/HR	REMARKS
HC-17	3RD FLOOR	CATH LAB	AHU-17	PREHEAT	8,830	642	0.126	45	60	143.1	30	15	151.2	1-TP-17A	250	

CHILLED WATER COOLING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR ROOM SERVED	SYSTEM AIR HANDLING	AIR FLOW CFM	MAX. FACE VELOCITY FPM	EAT Db °F	LAT Db °F	TOTAL CAPACILTY MBH	SENSIBLE CAPACITY MBH	CHILLED WATER FLOW GPM	CHILLED WATER EWT °F	CHILLED WATER LWT °F	CHILLED WATER WPD FT	REMARKS
CC-17	3RD FLOOR	CATH LAB	AHU-17	8,830	525	82.1	68.7	385.1	258.4	76.8	45	55	4.7	NOTE 1

NOTES:

1. COOLING COIL FAN SPACING SHALL NOT EXCEED 132 FINS PER FOOT (400 FINS PER METER).

PUMP SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	CIRCULATING FLUID: FLUID	FLOW GPM	HEAD FT	NPSH AVAILABLE FT	TEMP °F	SP. GR.	MIN. % EFF.	MOTOR ELECTRICAL: NOMINAL POWER HP	PHASE	VOLT	MAX. RPM	SPEED CONTROL	REMARKS
CWP-17	3RD FLOOR	CATH LAB	AHU-17	INLINE	CWS	80	20	–	45	1.0	65	3/4	3	208	1725	N/A	*

* PUMP SELECTION – DEAD HEAD AT 26 FT HD. SELECTION BASED ON B&G 90-34 S/T, 2AA, 2".

AIR FLOW MEASURING DEVICE SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	AIR FLOW MIN. CFM	AIR FLOW MAX. CFM	DUCT SIZE WIDTH IN	DUCT SIZE HEIGHT IN	APD	REMARKS
S-17-AFMD	ROOF	SUPPLY	0	8,830	30	30	0.10	IN AHU/DUCT
R-17-AFMD	ROOF	RETURN	0	8,830	48	24	0.10	

NOTES:

1. INSTALL ON FAN INLET.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions: | Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

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Drawing Title: MECHANICAL SCHEDULES

Approved Project Director

Control Number: VA256-13-C-0277

PO Number: 635-C35336

Project Title: REMODEL CARDIAC CATH LAB SUITE

Location: OKLAHOMA CITY VAMC
921 N.E. 13TH STREET, OKLAHOMA CITY, OK 73104

Date: 05-21-2015 | Checked: KLP | Drawn: JDM

Project Number: 635-CS1-102

Building Number: F

Drawing Number: MH601

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

NOTES

A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

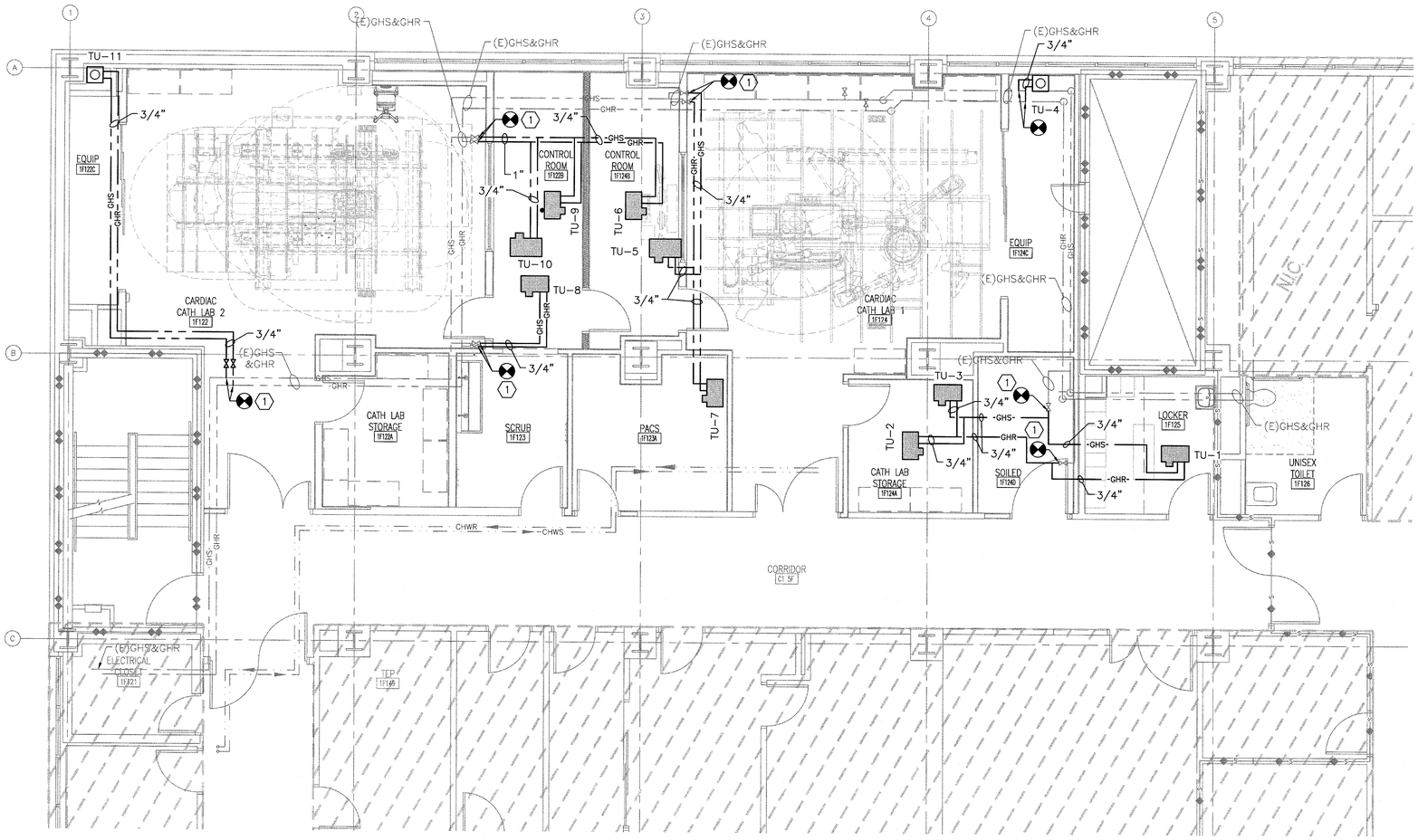
C. REFER TO SHEET MD101 FOR MECHANICAL PIPING DEMOLITION.

D. REFER TO SHEET MH101 FOR MECHANICAL HVAC NEW WORK.

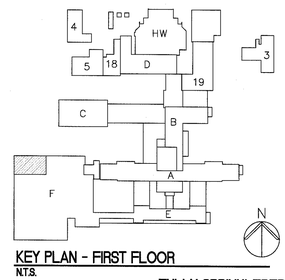
E. ALL PIPING IS 3/4" UNLESS NOTED OTHERWISE.

KEY NOTES ⬡

1. TIE INTO EXISTING LINES WITH NEW ISOLATION VALVES. REPLACE EXISTING VALVES AS REQUIRED.



F1 PARTIAL FIRST FLOOR PLAN
SCALE 1/4" = 1'-0"



KEY PLAN - FIRST FLOOR
N.T.S.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions:	Date

CONSULTANTS:

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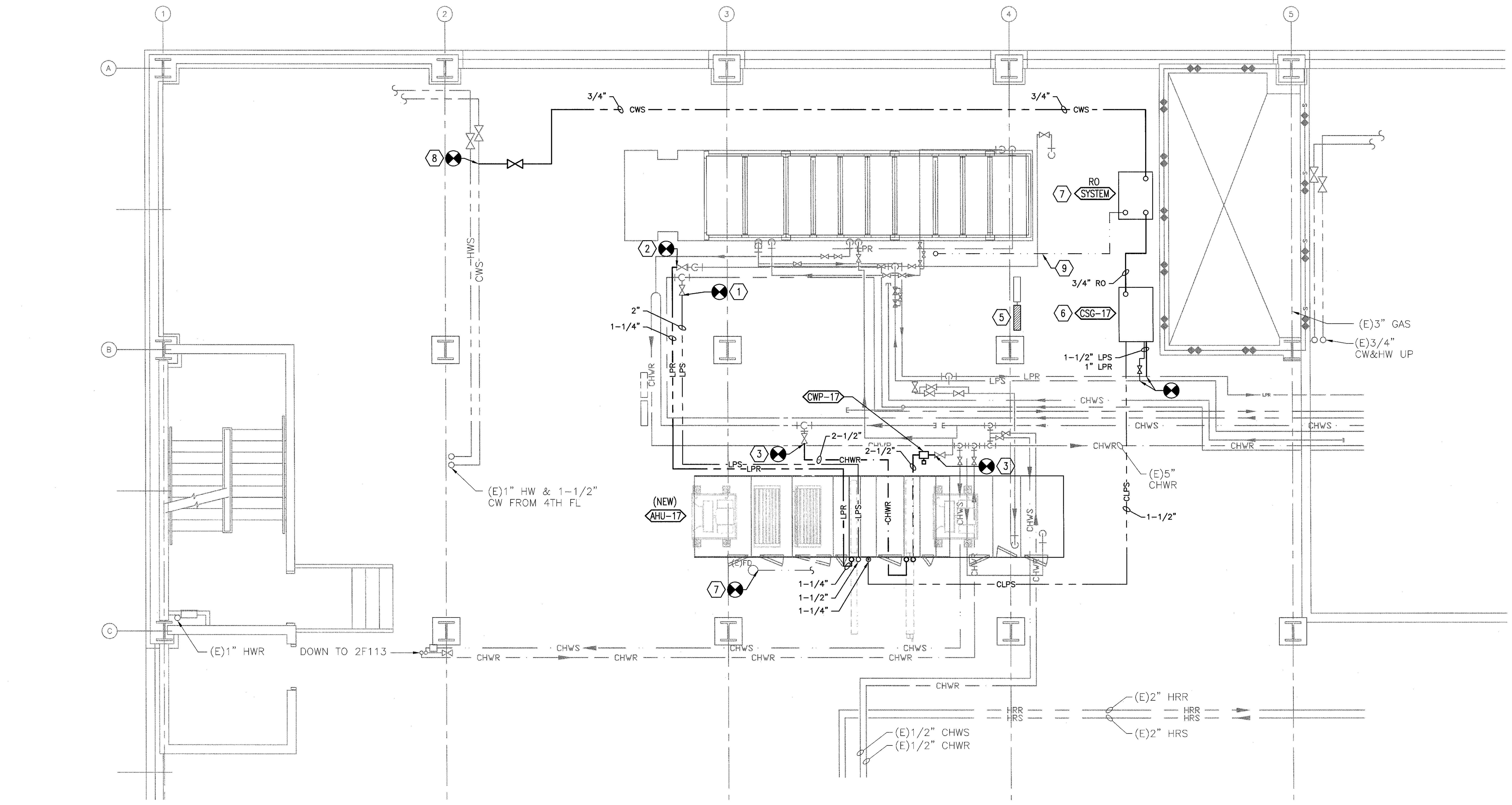
Drawing Title	MECHANICAL PIPING PLAN FIRST FLOOR
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Project Title	REMODEL CARDIAC CATH LAB SUITE
Location	OKLAHOMA CITY VAMC 921 N.E. 15TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Project Number	635-CS1-102
Building Number	F
Drawing Number	MP101

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



F1 PARTIAL THIRD FLOOR PLAN
SCALE 1/4" = 1'-0"

NOTES

A. REFER TO DWG. M-001 FOR MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

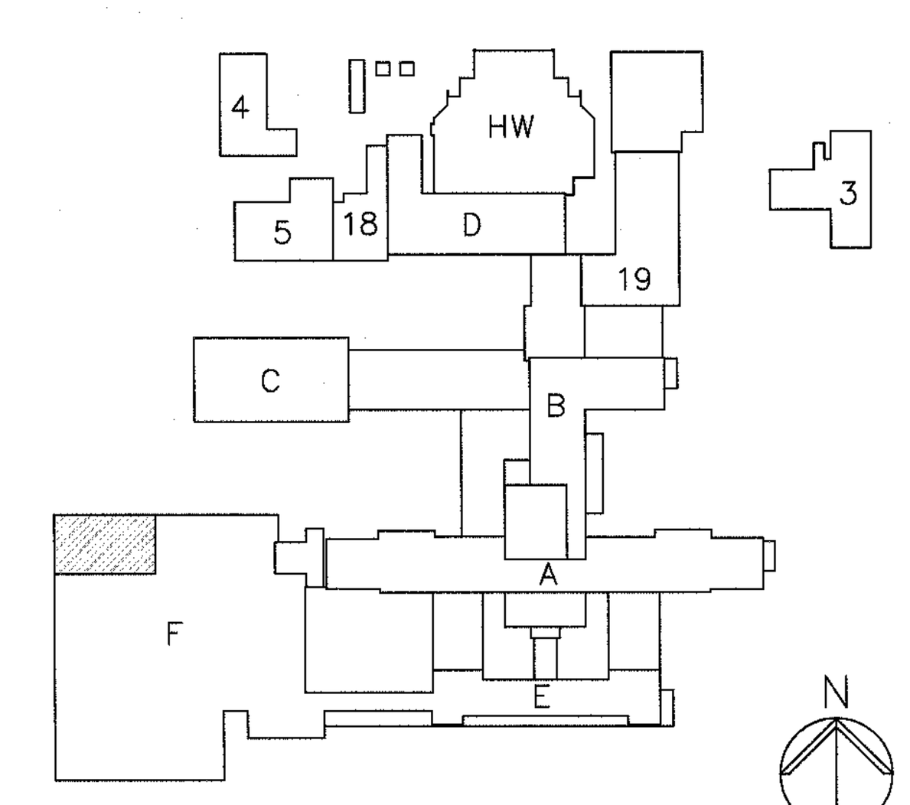
B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

C. REFER TO SHEET MD102 FOR MECHANICAL HVAC AND PIPING DEMOLITION WORK.

D. REFER TO SHEET MH102 FOR MECHANICAL HVAC NEW WORK.

KEY NOTES

1. CONNECT NEW 2" LPS TO EXISTING VALVE AND EXTEND TO NEW AHU-17. PREHEAT COIL (1-1/2") AND HUMIDIFIER (1-1/4").
2. CONNECT NEW 1-1/4" LPR TO EXISTING VALVE AND EXTEND TO NEW AHU-17.
3. CONNECT NEW 2-1/2" CHS AND CHR TO EXISTING VALVES AND EXTEND TO NEW AHU-17.
4. EXTEND NEW 1" CONDENSATE DRAIN FROM COOLING COIL AND HUMIDIFIER AND NEW AHU-17 TO EXISTING FLOOR DRAIN.
5. NEW AHU-17 CONTROL PANEL LOCATION.
6. INSTALL A NEW CLEAN STEAM GENERATOR. CONNECT TO LPS AND LPR AS INDICATED. EXTEND NEW CLEAN STEAM LINE TO AHU-17 HUMIDIFIER.
7. INSTALL NEW REVERSE OSMOSIS (RO) WATER TREATMENT SYSTEM. EXTEND NEW 3/4" RO LINE TO CSG.
8. INSTALL NEW TAP AND 3/4" VALVE IN COLD WATER LINE AND EXTEND TO NEW RO EQUIPMENT.
9. ROUTE NEW 1" DRAIN LINE FROM NEW RO EQUIPMENT TO EXISTING FLOOR DRAIN.



KEY PLAN - THIRD FLOOR
N.T.S.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions	Date	CONSULTANTS:	ARCHITECT/ENGINEERS:
			PARADIGM ENGINEERS AND CONSTRUCTORS 200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

Drawing Title	Project Title	Project Number	
MECHANICAL PIPING PLAN THIRD FLOOR	REMODEL CARDIAC CATH LAB SUITE	635-CS1-102	Office of Construction and Facilities Management
Approved Project Director	Location OKLAHOMA CITY VAMC 921 N.E. 13TH STREET, OKLAHOMA CITY, OK 73104	Building Number F	Department of Veterans Affairs
Control Number VA256-13-C-0277	Date 05-21-2015 / Checked KLP / Drawn JDM	Drawing Number MP102	
PO Number 635-C35336			

VA FORM 08-6231

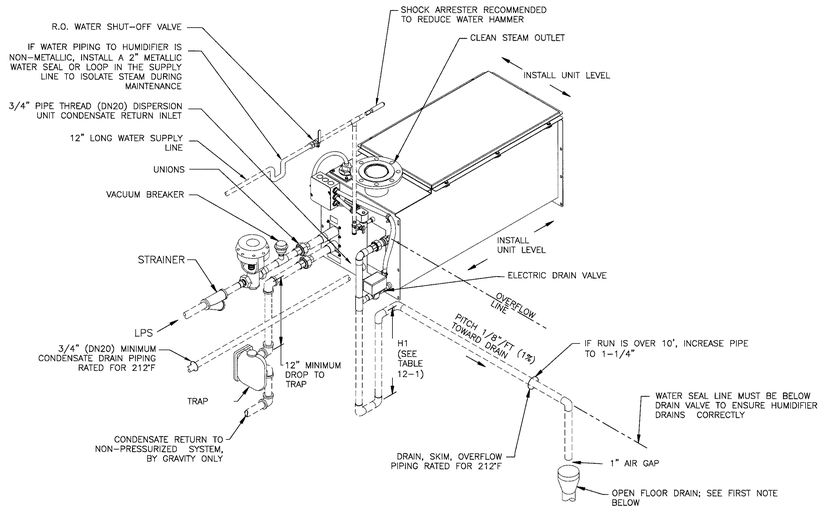
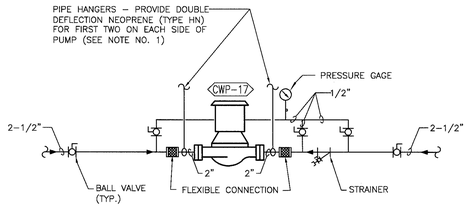


TABLE 12-1: HEIGHTS REQUIRED TO OVERCOME HUMIDIFIER INTERNAL PRESSURE (H1, H2)	
AIR VENT HEIGHT (H2)	
STS MODELS	
25, 50, 100, 200, 400	800
INCHES	INCHES
27	–
30	–
33	42.25

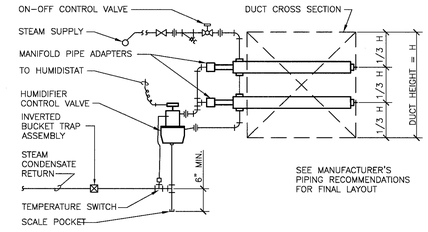
NOTE:
1. OFFSET HUMIDIFIER FROM FLOOR DRAIN TO PREVENT FLASH STEAM FROM RISING INTO THE HUMIDIFIER.
2. LOCATE AIR GAP ONLY IN SPACES WITH ADEQUATE TEMPERATURE AND AIR MOVEMENT TO ABSORB FLASH STEAM; OTHERWISE, CONDENSATION MAY FORM ON NEARBY SURFACES. REFER TO GOVERNING CODES FOR DRAIN PIPE SIZE AND MAXIMUM DISCHARGE WATER TEMPERATURE.
3. WATER INLET SUPPLY IS MORE THAN 1" ABOVE SKIM/OVERFLOW PORT, ELIMINATING THE POSSIBILITY OF BACKFLOW OR SIPHONING FROM TANK. NO ADDITIONAL BACKFLOW PREVENTION IS REQUIRED.
4. DAHSED LINES INDICATE PIPING INSTALLED IN FIELD.

C2 CLEAN STEAM GENERATOR
NOT TO SCALE

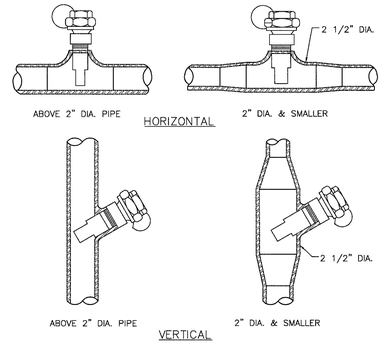


NOTES:
1. SUPPORT PUMP FROM PIPING ONLY. DO NOT SUPPORT PUMP FROM MOTOR.

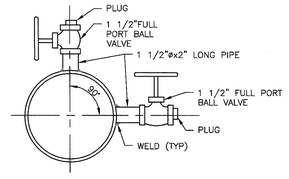
E4 PITOT TEST CONNECTIONS
NOT TO SCALE



B6 STEAM HUMIDIFIER-PIPING CONNECTIONS (MULTIPLE DISPERSION TUBES)
NOT TO SCALE

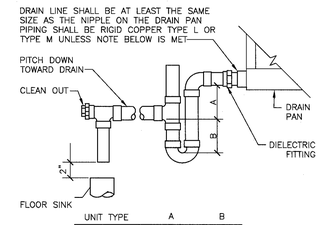


C6 INSTALLATION OF THERMOMETER WELLS
NOT TO SCALE



NOTE:
1. PROVIDE IN CHILLED WATER MAIN AND IN CONDENSER WATER MAIN.
2. LOCATE PILOT TUBE TAPS 20 PIPE DIAMETERS DOWNSTREAM AND 10 PIPE DIAMETERS UPSTREAM FROM THE NEAREST PIPE FITTING.
3. EITHER TOP OR SIDE LOCATION. BOTH ARE NOT REQUIRED AT SAME LOCATION.

E6 PILOT TEST CONNECTIONS
NOT TO SCALE



UNIT TYPE	A	B
DRAW THRU	2" PLUS X	X
BLOW THRU	1" MINIMUM	2X

WHERE X = STATIC PRESSURE IN PAN

NOTE:
1. CPVC PIPE MAY BE USED ONLY IF APPROVED BY LOCAL VA AND IS INDOORS AND DOES NOT PASS THROUGH RATED BARRIERS.
2. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.

F6 AIR HANDLING UNIT DRAIN TRAP DETAIL
NOT TO SCALE

NOTES

A. REFER TO DWG. M-001 FOR LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

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Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

PARADIGM
ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

BLAINE CASSIL VAN GAMBEKE 24,788 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY

Drawing Title	MECHANICAL PIPING DETAILS
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Project Title	REMODEL CARDIAC CATH LAB SUITE
Location	OKLAHOMA CITY VAMC, 921 NE 13TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Project Number	635-CS1-102
Building Number	F
Drawing Number	MP501

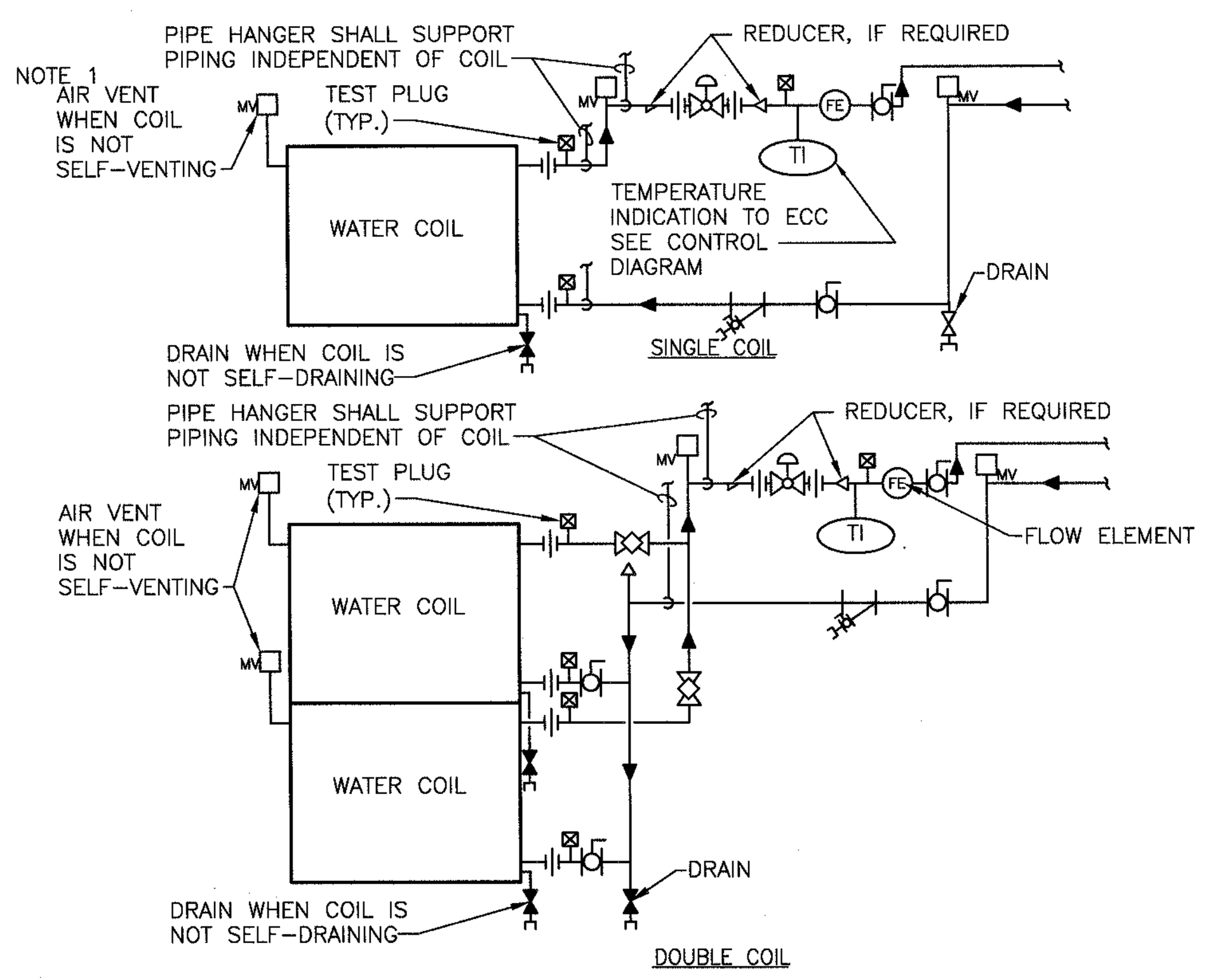
Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231

NOTES

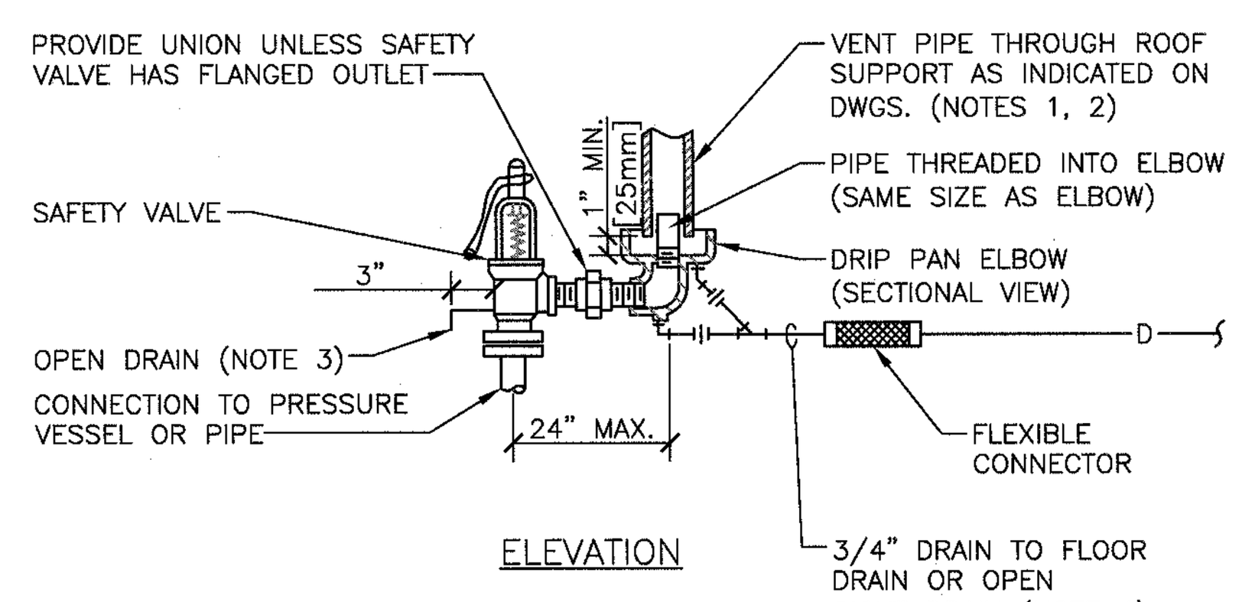
A. REFER TO DWG. M-001 FOR LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.



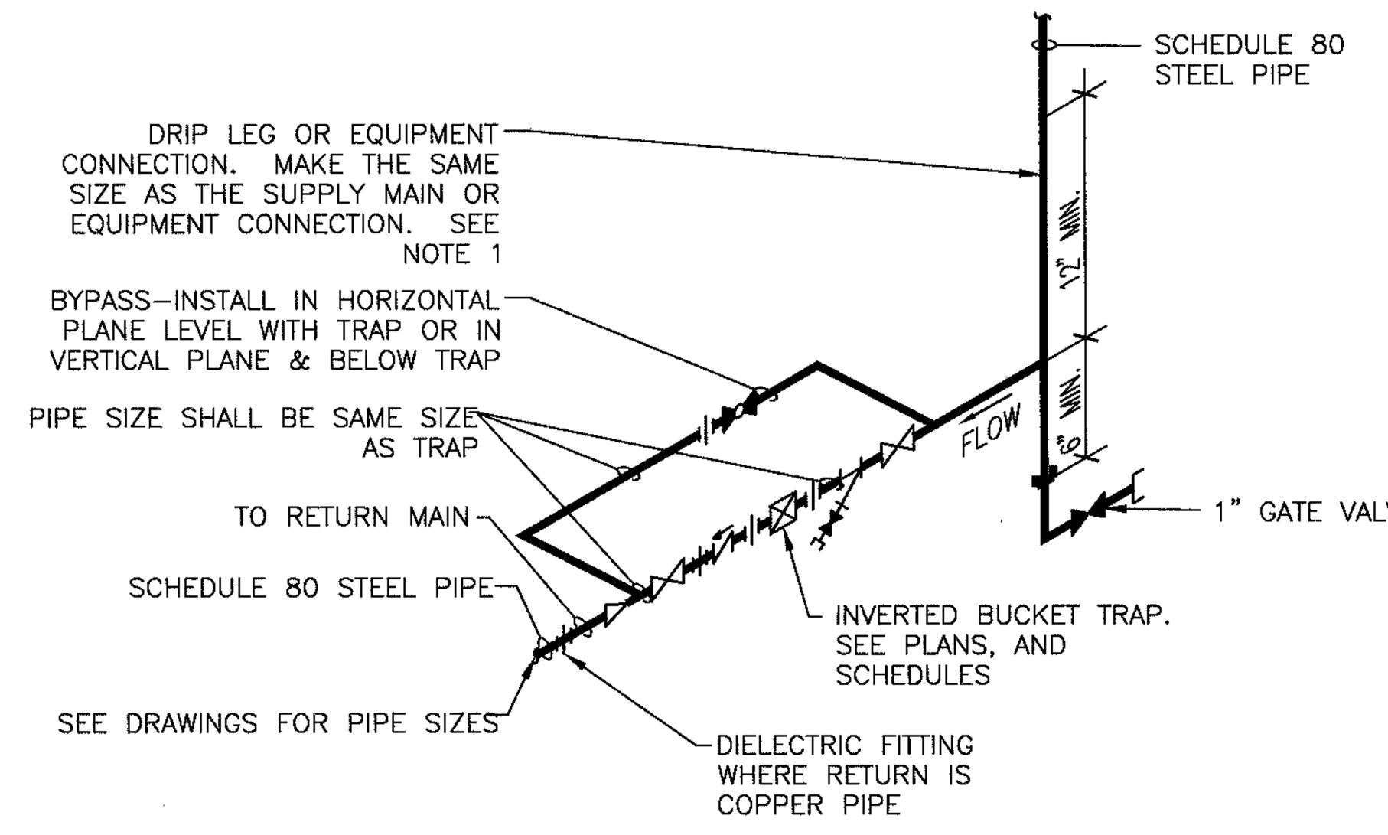
NOTES:
1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4"ø PIPE & SMALLER. TYPE "H-P" FOR 5"ø PIPE & LARGER.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALES, OR EQUIPMENT.
3. THE FLOW ELEMENT MAY BE INSTALLED IN THE SUPPLY PIPING IF THE REQUIRED MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS CANNOT BE OBTAINED IN THE RETURN PIPING.

C1 WATER COILS - PIPING CONNECTIONS
NOT TO SCALE



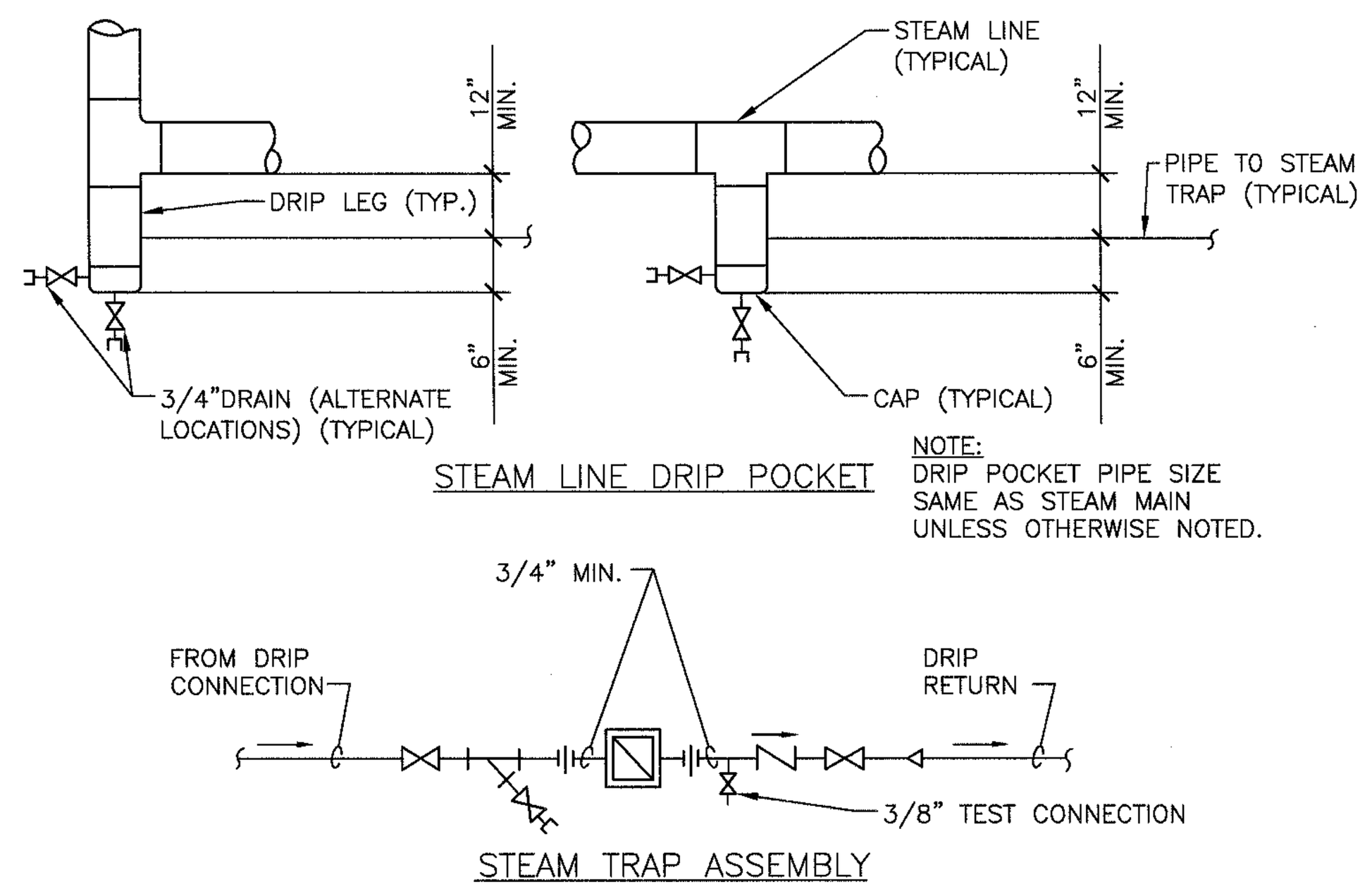
NOTES:
1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1. POWER PIPING CODE, APPENDIX II.
2. VENT PIPE SHALL TERMINATE 6' MIN. ABOVE FINISHED ROOF.
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

C2 STEAM SAFETY VALVE
NOT TO SCALE

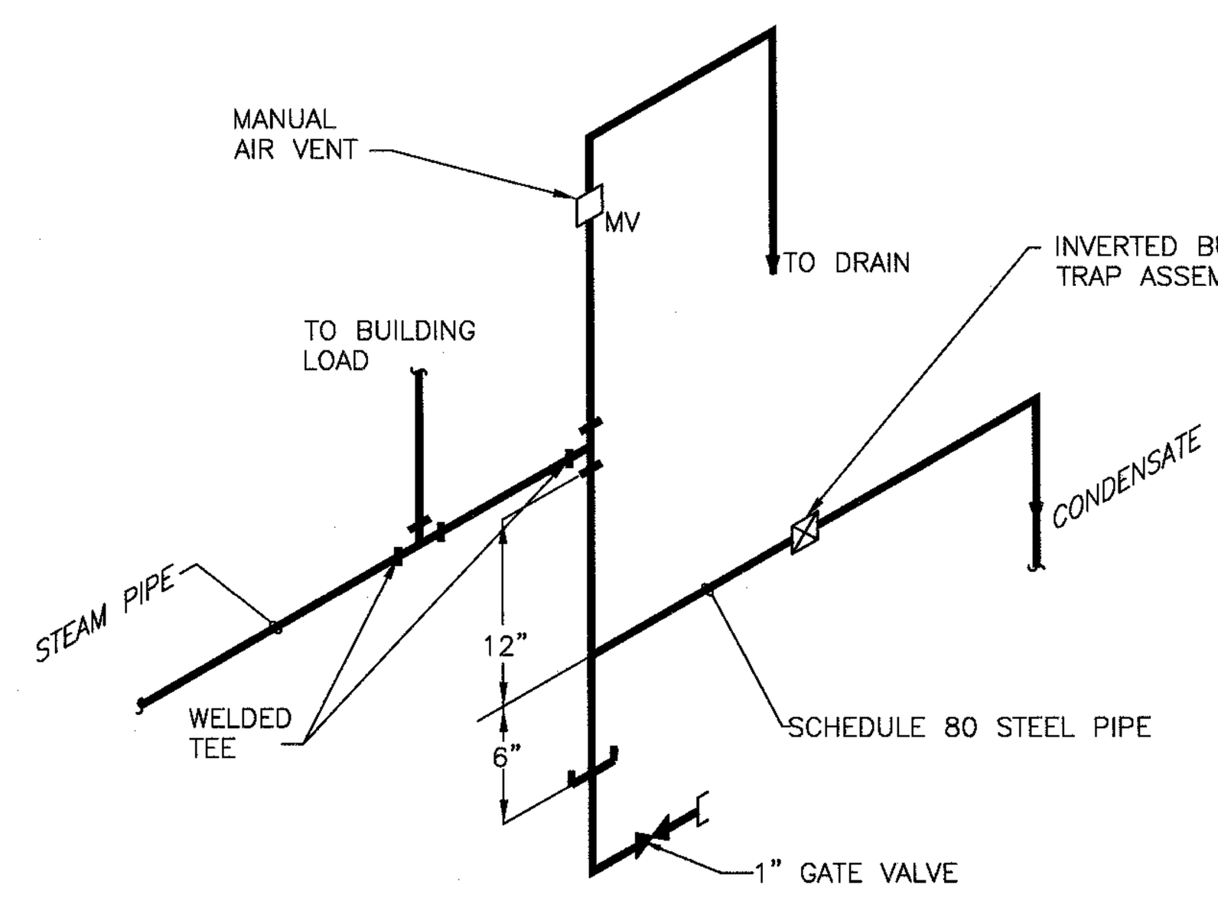


NOTES:
1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.
2. PROVIDE BYPASS PIPING.

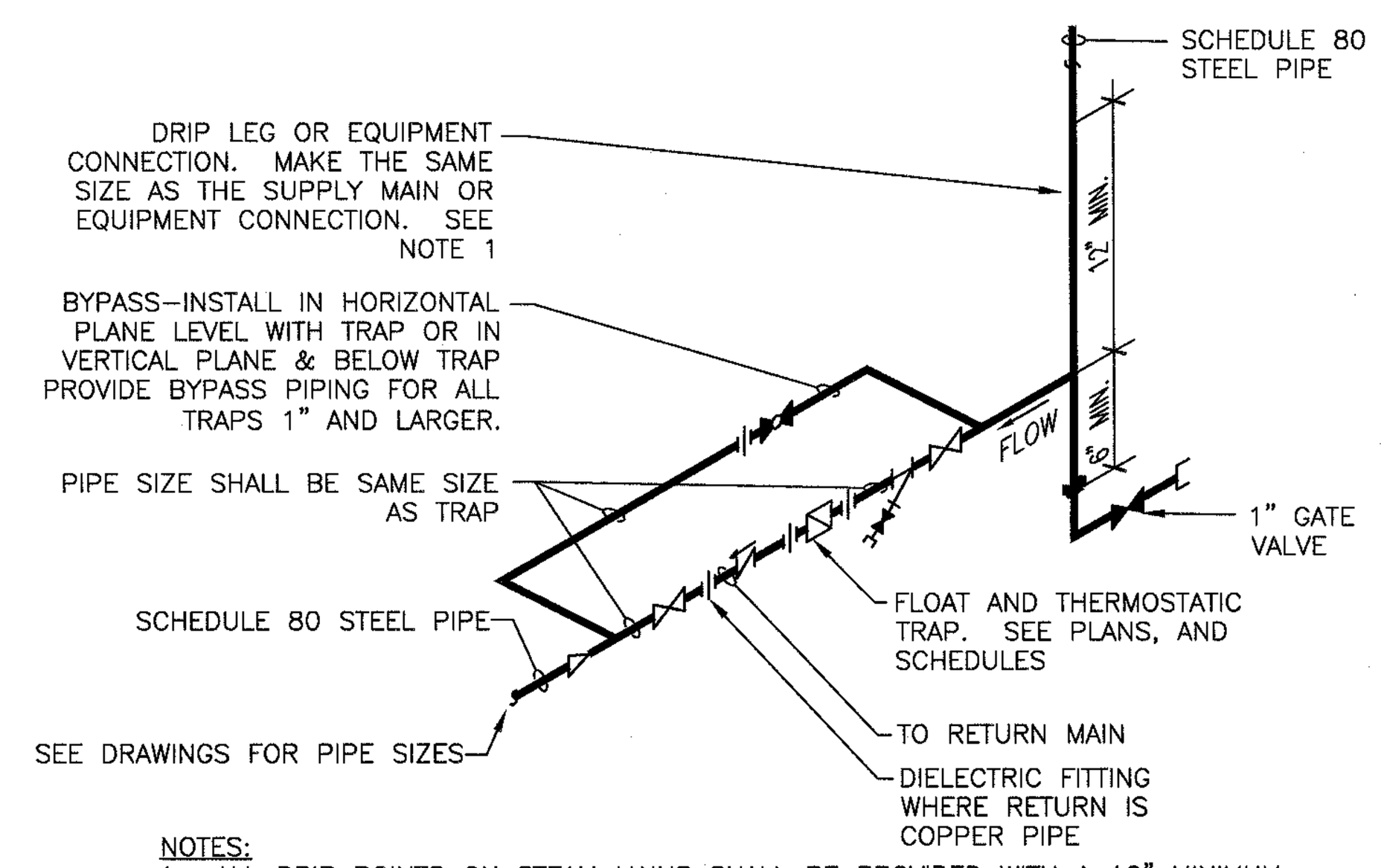
B4 INVERTED BUCKET STEAM TRAP ASSEMBLY
NOT TO SCALE



B6 STEAM LINE DRIP POCKET STEAM TRAP ASSEMBLY
NOT TO SCALE

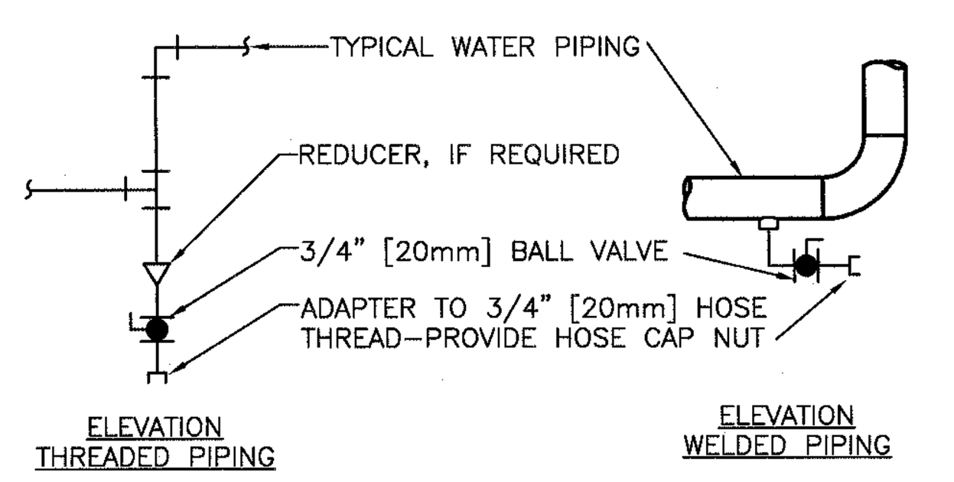


C4 END OF STEAM LINE DRIP TRAP
NOT TO SCALE



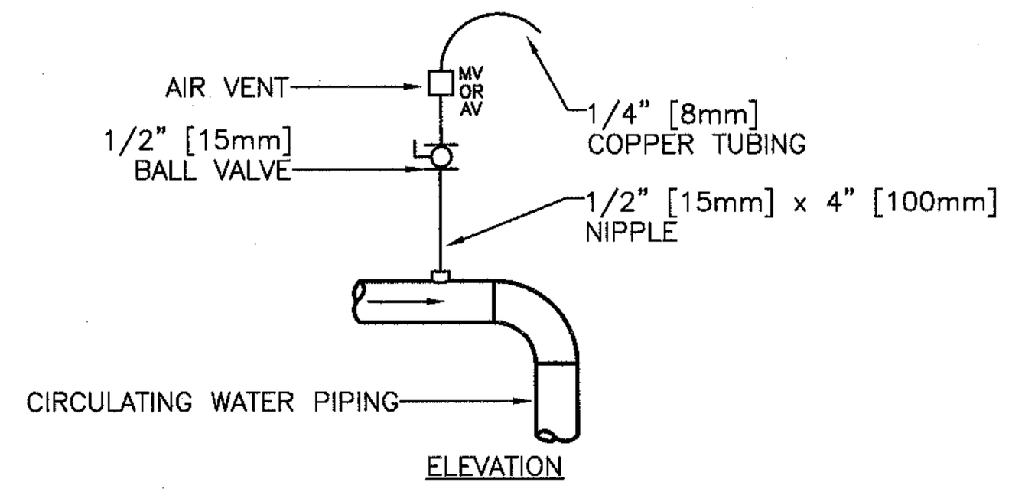
NOTES:
1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

C6 FLOAT AND THERMOSTATIC STEAM TRAP ASSEMBLY
NOT TO SCALE



TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

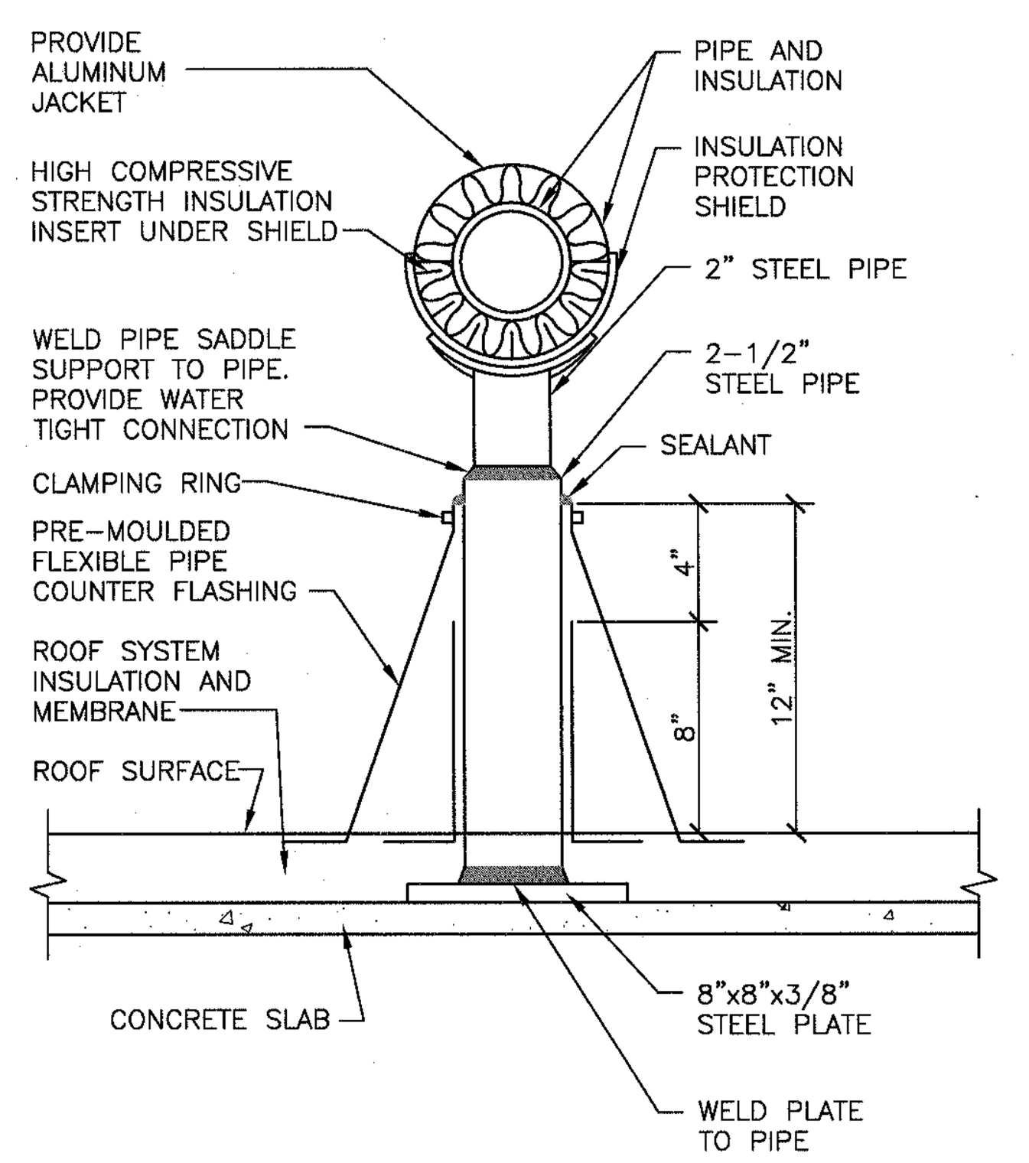
NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.
2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.



TYPICAL MANUAL AIR VENT

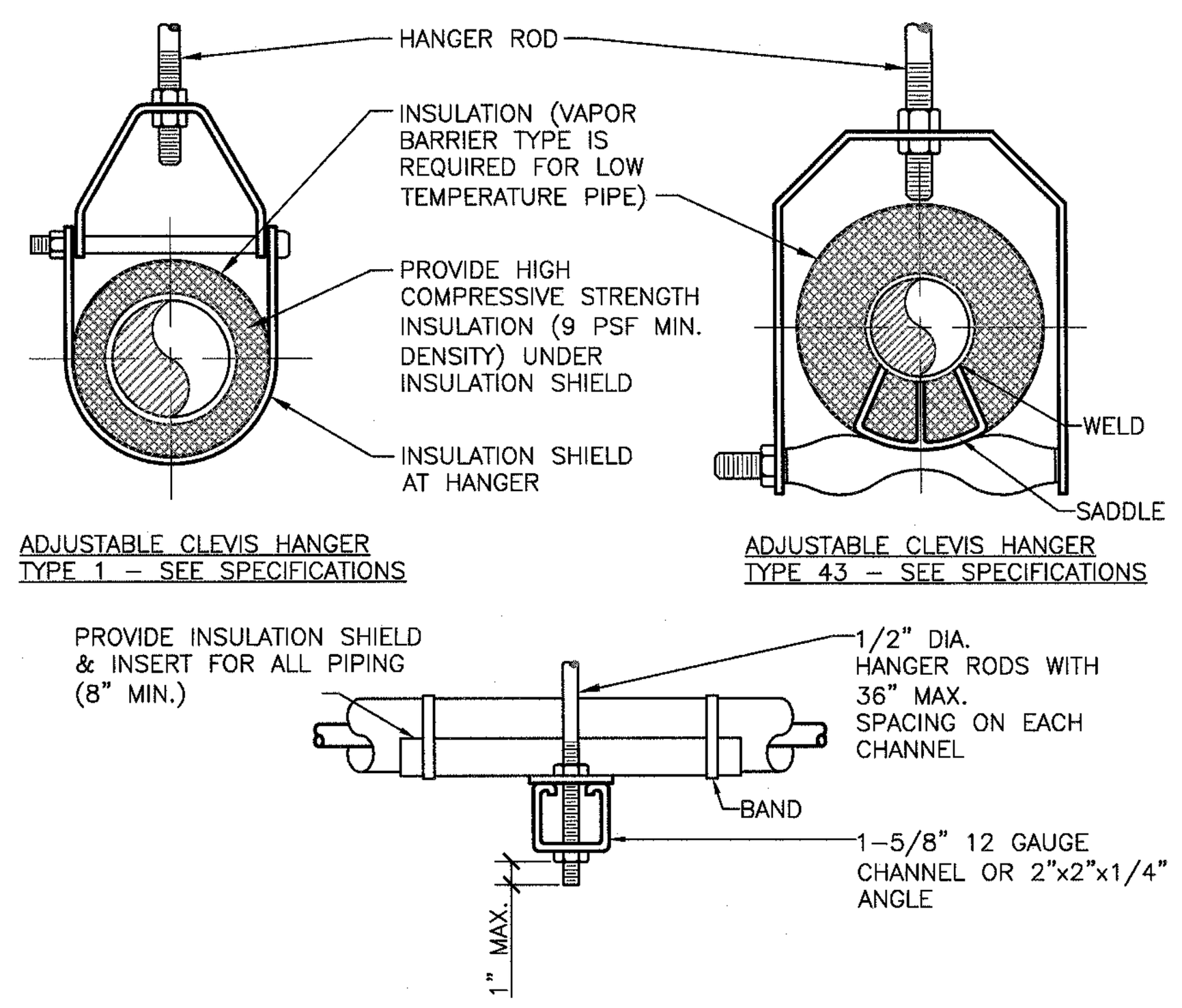
NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN.

F1 DRAIN VALVE AND AIR VENT CONNECTIONS (HYDRONIC SYSTEMS)
NOT TO SCALE



NOTES:
1. PROVIDE RESTRAINING CLAMPS 8'-0" O.C.

F2 DETAIL FOR SUPPORTING PIPE ON GROUND
NOT TO SCALE



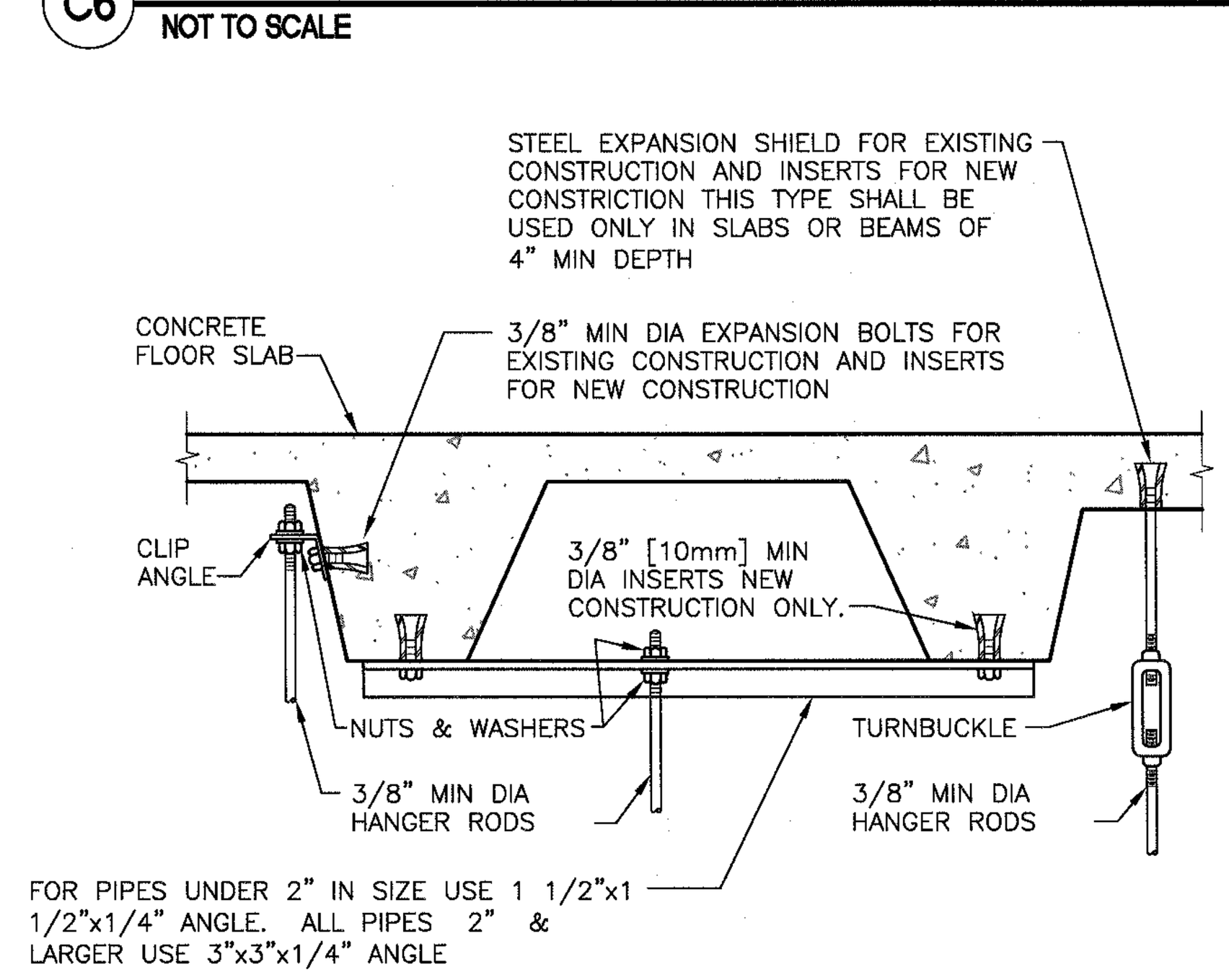
SIDE VIEW TRAPEZE HANGER FOR UP TO 1000 LB. UNIFORM LOAD

MAXIMUM PIPE/TUBING SUPPORT SPACING																		
NOM. SIZE (IN.)	THRU 3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE (FT.)	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
TUBING (FT.)	5 FT.	6	7	8	8	9	10	12	13	14	16	–	–	–	–	–	–	–

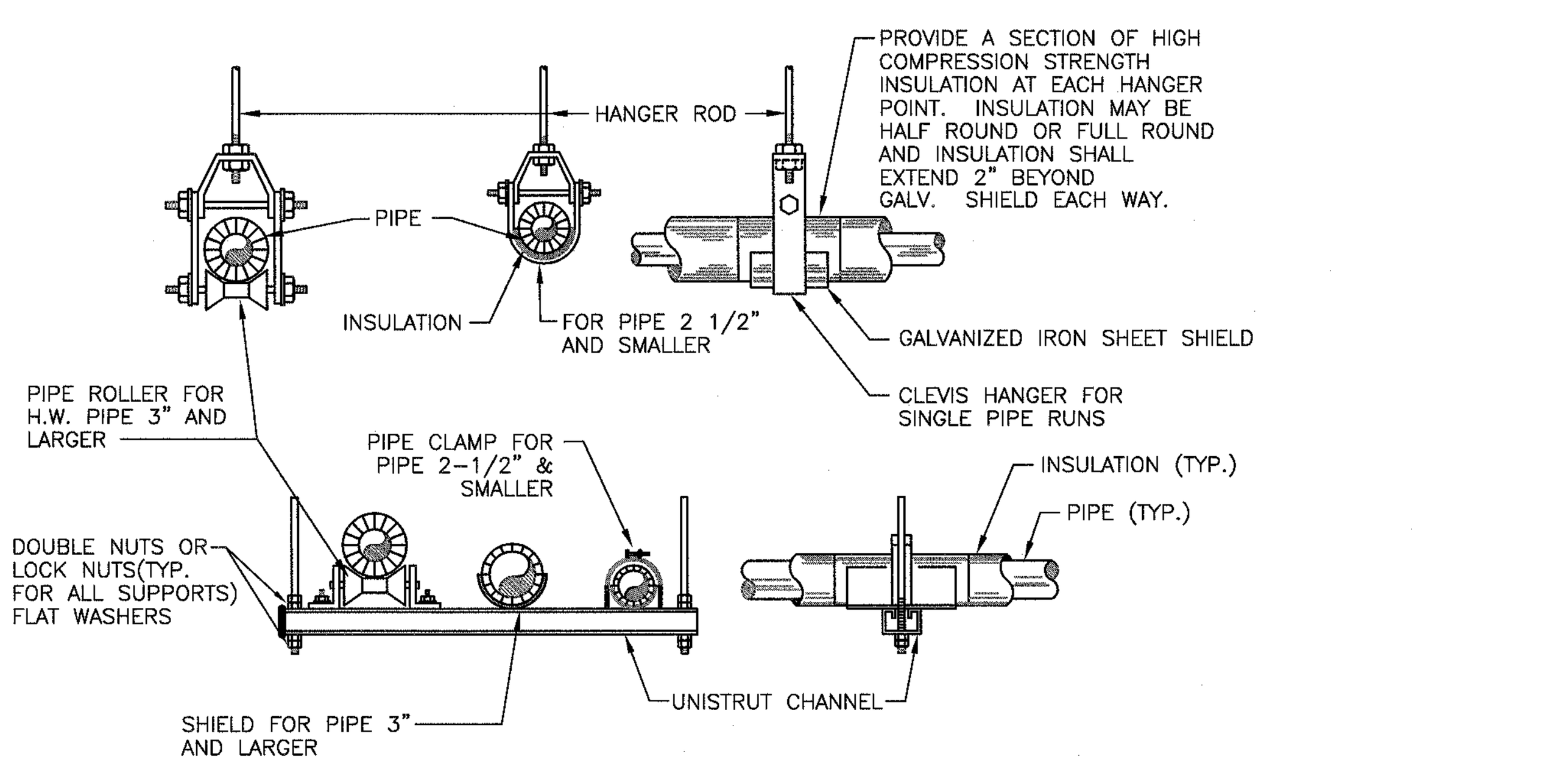
NOTES:
1. FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.

NOTES:
1. SEE SPECIFER FOR DETAILED HANGER REQUIREMENTS.

F4 PIPE HANGERS
NOT TO SCALE



E6 SECURING HANGER RODS IN CONCRETE
NOT TO SCALE



F6 PIPE HANGERS AND SUPPORTS DETAIL
NOT TO SCALE

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Revisions	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:
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STATE OF KENTUCKY — BLAKE CASSEL VAN GAMMEREN — 34,799 — LICENSED PROFESSIONAL ENGINEER — 5/21/2015

Drawing Title: MECHANICAL PIPING DETAILS	Project Title: REMODEL CARDIAC CATH LAB SUITE	Project Number: 635-CS1-102	Office of Construction and Facilities Management
Approved Project Director / Control Number: VA256-13-C-0277	Location: OKLAHOMA CITY VAMC, 921 N.E. 13TH STREET, OKLAHOMA CITY, OK 73104	Building Number: F	
PO Number: 635-C35336	Date: 05-21-2015 / Checked: KLP / Drawn: JDM	Drawing Number: MP502	Department of Veterans Affairs

VA FORM 08-6231

ABBREVIATIONS

(NOT ALL SYMBOLS WILL APPLY TO THIS WORK)

A/E	ARCHITECT / ENGINEER
AD	AREA DRAIN
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AG	AIR GAP
AP	ACCESS PANEL
AS	AUTOMATIC SPRINKLER
ASD	ADJUSTABLE SPEED DRIVES
ASD	AUTOMATIC SPRINKLER DRAIN
ASHRAE	AMERICAN SOCIETY HEATING, REFRIGERATION, AIR CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY MECHANICAL ENGINEERS
ASPE	AMERICAN SOCIETY PLUMBING ENGINEERS
ASR	AUTOMATIC SPRINKLER RISER
AV	ACID VENT
AW	ACID WASTE
BFP	REDUCED PRESSURE BACKFLOW PREVENTER
BHP	BREAK HORSEPOWER
BSP	BLACK STEEL PIPE
BT	BATHTUB
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CELSIUS
CGA	COMPRESSED GAS ASSOCIATION
CI	CAST IRON
CO	CLEANOUT
CS	CLINICAL SINK
CV	CONTROL VALVE
(D)	EXISTING ITEM TO BE DEMOLISHED
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RETURN
DHWR	DOMESTIC WATER RETURN
DHWS	DOMESTIC HOT WATER SUPPLY
DI	DEIONIZED WATER
DN	DOWN
DOE	DEPARTMENT OF ENERGY
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
DWH	DOMESTIC WATER HEATER
DWR	DRINKING WATER RETURN
DWS	DRINKING WATER SUPPLY
DWV	DRAIN WASTE VENT
(E)	EXISTING ITEM TO REMAIN
EL	ELEVATION
EMCS	ENERGY MONOSERRAT AND CENTRAL SYSTEM
EPA	ENVIROMENTAL PROTECTION AGENCY
EPACT	ENERGY POLICY ACT
ESC	ESCUTCHEON
ESH	EMERGENCY SHOWER
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EWS	EYE WASH STATION
EX	EXISTING
F	FAHRENHEIT
FCO	FLOOR CLEANOUT
FCW	FILTERED COLD WATER
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT (HOSE) CONNECTION
FM	FLOW METER
FOP	FUEL OIL PUMP
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOV	FUEL OIL VENT
FS	FLOOR SINK
FS	FLOW SWITCH
FU	FIXTURE UNITS
GAL	GALLON
GCO	GRADE CLEANOUTS
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPR	GAS PRESSURE REGULATOR
GRS	GAS REGULATOR STATION
GT	GREASE TRAP
GVTR	GAS VENT THROUGH ROOF
GWH	GAS FIRED WATER HEATER
H&CW	HOT AND COLD WATER
HB	HOSE BIBB
HD	HUB DRAIN
HEX	HEAT EXCHANGER
HP	HORSEPOWER
HS	HAND SINK
HST	HOT WATER STORAGE TANK (DOMESTIC)
HWB	HOT WATER BOILER
HWCP	HOT WATER CIRCULATING PUMP
HWP	HOT WATER PUMP
HYD	HYDRANT
ICW	INDUSTRIAL COLD WATER
INV	INVERT
IPC	INTERNATIONAL PLUMBING CODE
IRW	IRRIGATION WATER
IW	INDIRECT WASTE
IWH	INSTANTANEOUS WATER HEATER
IWR	INDUSTRIAL WATER RETURN
IWS	INDUSTRIAL WATER SUPPLY
KW	KILOWATT
KWHR	KILOWATT-HOUR
L/S	LITER PER SECOND
LA	LABORATORY AIR
LAV	LAVATORY
LBS/HR	POUNDS PER HOUR
LCW	LABORATORY COLD WATER
LHW	LABORATORY HOT WATER
LNG	LIQUID NATURAL GAS
LOX	LIQUID OXYGEN
LV	LABORATORY VACUUM
LW	LOW WATER
M	METER
MA	MEDICAL AIR
MAV	MANUAL AIR VENT
MBH	1000 BTUH
MED	MEDICAL
MER	MECHANICAL EQUIPMENT ROOM
MH	MANHOLE
MOU	MEMORANDUM OF UNDERSTADING
MSB	MOP SERVICE BASIN
MV	MEDICAL VACUUM
N2	NITROGEN
N20	NITROUS OXIDE
NC	NORMALLY CLOSED
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM.A.	NOMINAL
NPW	NON POTABLE WATER
NTC	NOT TO SCALE
O2	OXYGEN
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFD	OVERFLOW DRAIN
OR	OPERATING ROOM
OVFL	OVERFLOW
PA	PASCAL
PD	PRESSURE DROP OR DIFFERENCE
PDI	PLUMBING AND DRAINAGE INSTITUTE
PG	PRESSURE GAGE
PP	PLUMBING PUMP
PPM	PARTS PER MILLION
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ATMOSPHERE
PSIG	POUNDS PER SQUARE INCH GAUGE
PTRV	PRESSURE TEMPERATURE RELIEF VALVE
PW	POTABLE WATER
RD	ROOF DRAIN
RDL	ROOF DRAIN LEADER
RL	ROOF LEADER
RO	REVERSE OSMOSIS WATER
RWL	RAIN WATER LEADER
SAN	SANITARY SEWER
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SCFM	STANDARD CUBIC FOOT/MINUTE
SCW	SOFTENED COLD WATER
SDMH	STORM DRAIN MANHOLE
SP	SUMP PUMP
SPR	SPRINKLER LINE
SQFT	SQUARE FEET
SS	STAINLESS STEEL
ST	STORAGE TANK
SW	STORM WATER
TCV	TEMPERATURE CONTROL VALVE
TD	TEMPERATURE DIFFERENCE
TD	TRENCH DRAIN
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TMV	THERMOSTATIC MIXING VALVE
TP	TRAP PRIMER
TSTAT	THERMOSTAT
TWR	TEMPERED WATER RETURN
TWS	TEMPERED WATER SUPPLY
TYP	TYPICAL
UPC	UNIFORM PLUMBING CODE
V	VENT
VAC	VACUUM
VB	VACUUM BREAKER
VCO	VACUUM CLEANER OUTLET
VP	VACUUM PUMP
VS	VENT STACK
VTR	VENT THROUGH ROOF
W	WASTE
WC	WATER CLOSET
WCO	WALL CLEANOUT
WG	WATER GAGE
WH	WALL HYDRANT
WH	WATER HEATER
WHA	WATER HAMMER ARRESTER
WL	WATER LINE
WM	WATER METER
WPD	WATER PRESSURE DROP
WS	WASTE STACK
YCO	YARD CLEANOUT
YH	YARD HYDRANT

VALVE SYMBOLS

(NOT ALL SYMBOLS WILL APPLY TO THIS WORK)

- GATE VALVE – THREADED/FLANGED
- GLOBE VALVE – THREADED/FLANGED
- GATE VALVE WITH 3/4" HOSE ADAPTER
- CHECK VALVE
- WYE STRAINER (WITH BALL VALVE & HOSE CONNECTION)
- WYE STRAINER WITH VALVED DRAIN AND QUICK-COUPLE HOSE CONNECTOR
- FLEXIBLE CONNECTION
- ANGLE GLOBE VALVE
- BUTTERFLY VALVE
- BALL VALVE
- MODULATING CONTROL VALVE
- MODULATING CONTROL BUTTERFLY VALVE
- TWO POSITION CONTROL VALVE
- THREE-WAY MODULATING CONTROL VALVE
- THREE-WAY TWO POSITION CONTROL VALVE
- PRESSURE REGULATING VALVE
- PRESSURE SAFETY VALVE
- AUTOMATIC BALANCING CONTROL VALVE
- WATER BALANCE DEVICE
- CIRCUIT SETTER VALVE
- GATE VALVE WITH GLOBE-VALVED BYPASS
- PLUG VALVE
- CONTROL VALVE (CV) – FLOAT-OPERATED
- PRESSURE REDUCING VALVE (PRV)
- LC — WATER LEVEL CONTROLLER
- M — FLOW METER

GENERAL PIPING SYMBOLS

(NOT ALL SYMBOLS WILL APPLY TO THIS WORK)

- DIRECTION OF PIPE PITCH (DOWN)
- DIRECTION OF FLOW
- ANCHOR
- REDUCER OR INCREASER
- ECCENTRIC REDUCER
- TOP CONNECTION, 45° OR 90°
- BOTTOM CONNECTION, 45° OR 90°
- SIDE CONNECTION
- CAPPED OUTLET
- RISE OR DROP IN PIPE
- UNION
- PIPE UP
- PIPE DOWN
- INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
- FLOAT & THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
- THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
- THERMOMETER
- PRESSURE GAGE
- FE — FLOW ELEMENT
- REFRIGERANT SIGHT GLASS
- TEST PLUG (PRESSURE/TEMPERATURE)
- AV — AUTOMATIC AIR VENT
- MV — MANUAL AIR VENT
- QUICK-COUPLE HOSE CONNECTOR
- END OF DEMOLITION
- CONNECTION BETWEEN NEW AND EXISTING
- EXISTING ITEMS TO BE DEMOLISHED
- 1 — RISER NUMBER (EXAMPLE=1)
- A1 / MD501 — PHOTO INDICATOR
- PENETRATION

PIPING SYMBOLS

(NOT ALL SYMBOLS WILL APPLY TO THIS WORK)

HPS	HIGH PRESSURE STEAM (60 PSIG AND ABOVE)
HPR	HIGH PRESSURE STEAM CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG)
MPR	MEDIUM PRESSURE STEAM CONDENSATE RETURN
LPS	LOW PRESSURE STEAM (15 PSIG AND BELOW)
LPR	LOW PRESSURE STEAM CONDENSATE RETURN
PC	CONDENSATE PUMP DISCHARGE
HWS	HOT WATER HEATING SUPPLY
HWR	HOT WATER HEATING RETURN
GHS	GLYCOL-WATER HEATING SUPPLY
GHR	GLYCOL-WATER HEATING RETURN
SWS	SOLAR WATER SUPPLY
SWR	SOLAR WATER RETURN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RHG	REFRIGERANT HOT GAS
CWS	CHILLED WATER SUPPLY (FROM TOWER)
CWR	CHILLED WATER RETURN (TO TOWER)
GCS	CHILLED GLYCOL-WATER SUPPLY
GCR	CHILLED GLYCOL-WATER RETURN
MW	MAKE-UP WATER
D	DRAIN LINE
V	VENT LINE
GRS	GLYCOL-WATER RUN AROUND SUPPLY
GRR	GLYCOL-WATER RUN AROUND RETURN
X	EXISTING PIPE TO BE REMOVED
FWPD	FEEDWATER PUMP DISCHARGE
FWPS	FEEDWATER PUMP SUCTION
CTPD	CONDENSATE TRANSFER PUMP DISCHARGE
CTPS	CONDENSATE TRANSFER PUMP SUCTION
VR	VACUUM CONDENSATE RETURN
TC	TUBE CLEANER WATER SUPPLY
BO	BOILER BLOWOFF
CBD	CONTINUOUS BLOWDOWN
BWS	BOILER WATER SAMPLE
FWS	FEEDWATER SAMPLE (FROM DEAERATOR)
CF	CHEMICAL FEED
OFL	OVERFLOW
A	COMPRESSED AIR
G	NATURAL GAS MAIN FUEL
G(I)	NATURAL GAS IGNITER FUEL
LPG(I)	LIQUEFIED PETROLEUM GAS IGNITER FUEL
FOS	FUEL OIL SUPPLY
FOR	FUEL OIL RETURN
CW	COLD WATER (CITY WATER)
SW	SOFTENED WATER
HW	HOT WATER
RH	ROLLER-TYPE HANGER
SH	VARIABLE SPRING-TYPE HANGER (TYPE 51)*
SCH	SPRING CUSHION-TYPE HANGER (TYPE 48 OR 49)*
	CLEVIS-TYPE HANGER
TH	TRAPEZE HANGER (PROVIDE U-BOLT PIPE ATTACHMENT TO TRAPEZE EXCEPT WHERE RH ARE INDICATED)
PS	FLOOR-SUPPORTED PIPE STAND
RC	RISER CLAMP (TYPE 42)*
WB	WALL BRACKET (TYPE 31, 32, 33)*
CSH	CONSTANT SUPPORT HANGER (TYPE 54, 55, 56)*
SS	SLIDING SUPPORTS (TYPE 35)*

* TYPE NUMBERS REFER TO MANUFACTURER'S STANDARDIZATION SOCIETY STANDARD PRACTICE SP-58

W	EXISTING SANITARY PIPE
V	EXISTING VENT PIPE
W	NEW SANITARY WASTE PIPE
V	NEW SANITARY VENT PIPE
MA	NEW MEDICAL AIR LINE
V	NEW VACUUM LINE
O	NEW OXYGEN LINE
RO	NEW REVERSE OSMOSIS WATER LINE

EXECUTION

1. LAYOUT: PLUMBING
   a. PRIOR TO INSTALLATION, LAYOUT ALL PLUMBING WORK IN A MANNER THAT WILL ALLOW INSTALLATION OF ALL OTHER WORK INDICATED.

   b. COORDINATE AND COMMUNICATE INSTALLATION OF PLUMBING WORK WITH THAT OF OTHER TRADES, SO THAT ALL WORK MAY BE INSTALLED IN SPACE AVAILABLE.

   c. PROVIDE ALL ADA INSULATION PROTECTION AS REQUIRED.

2. EQUIPMENT:
   a. INSTALL ALL MATERIAL AND EQUIPMENT IN A NEAT AND WORK- MANLIKE MANNER IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND PROVIDE FOR THE FOLLOWING:

      i. CONNECTION OF PIPING AND ACCESSORIES TO EQUIPMENT SHALL PERMIT EASY REMOVAL WITH MINIMUM OF DISTURBANCE TO OTHER EQUIPMENT AND MATERIALS.
      ii. ITEMS REQUIRING INSPECTION, ADJUSTMENT, MAINTENANCE, SERVICING OR REPLACEMENT SHALL BE EASILY ACCESSIBLE.

   b. SLEEVE TO BE INSTALLED (2" MINIMUM AFF) FOR ALL PENETRATIONS.

3. EXISTING PLUMBING SYSTEMS:
   a. ALL EXISTING PIPING, MATERIALS OR EQUIPMENT NOT REQUIRED FOR THE NEW SYSTEM, WHETHER OR NOT SUCH ITEMS ARE INDICATED ON PLANS, SHALL BE REMOVED. THE STATUS OF ALL SUCH ITEMS SHALL BE VERIFIED BY THIS CONTRACTOR BEFORE DISCONNECTING, CAPPING OR REMOVING.

   b. ALL EXISTING PIPING, MATERIALS OR EQUIPMENT WHICH WILL REMAIN AS PART OF THE ACTIVE SYSTEM SHALL BE VISUALLY INSPECTED. ANY SUCH ITEMS FOUND TO BE DEFECTIVE SHALL BE REMOVED AND REPLACED WITH NEW MATERIALS OF LIKE SUBSTANCE, SIZE AND TYPE. ALL PLUMBING SYSTEMS THAT HAVE BEEN REPAIRED, MODIFIED OR RELOCATED SHALL BE TESTED IN ACCORDANCE WITH THIS SPECIFICATION FOR NEW SYSTEMS.

TESTS AND INSPECTIONS

1. DOMESTIC WATER SYSTEM – STERILIZE THE ENTIRE WATER DISTRIBUTION SYSTEM THOROUGHLY WITH A SOLUTION CONTAINING NOT LESS THAN 50 PARTS PER MILLION OF AVAILABLE CHLORINE. USE EITHER LIQUID CHLORINE OR CALCIUM HYPOCHLORITE CONFORMING TO FEDERAL SPECIFICATIONS. ALLOW THE STERILIZING SOLUTION TO REMAIN IN THE SYSTEM FOR EIGHT HOURS. DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, THE SOLUTION SHALL BE FLUSHED FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUAL CHLORINE CONTENT IS NOT GREATER THAN 0.2 PARTS PER MILLION UNLESS DIRECTED OTHERWISE. TEST SYSTEM HYDROSTATICALLY AT 100 PSIG MINIMUM FOR A PERIOD OF 24 HOURS WITH A PRESSURE LOSS NOT TO EXCEED 1 PSIG.

2. SANITARY DRAINAGE SYSTEM – SHALL BE WATER TESTED BEFORE FINAL CONNECTION TO THE SANITARY SEWER. ALL OPENINGS SHALL BE PLUGGED EXCEPT THE HIGHEST OPENING WHICH SHALL PRODUCE A MINIMUM OF A 10 FOOT HEAD. THE SYSTEM SHALL RETAIN THE WATER LEVEL FOR AT LEAST 15 MINUTES AT WHICH TIME ALL JOINTS SHALL BE INSPECTED AND ALL OBSERVED LEAKS CORRECTED.

3. FINAL INSPECTION – BEFORE FINAL INSPECTION, CERTIFY IN WRITING THAT ALL SYSTEMS ARE INSTALLED, ADJUSTED, TESTED AND READY FOR USE.

OTHER

1. GUARANTEE – ALL WORK FOR WHICH MATERIALS ARE FURNISHED, FABRICATED OR FIELD ERECTED BY THE CONTRACTOR. ALL FACTORY-ASSEMBLED EQUIPMENT FOR WHICH NO SPECIFIC MANUFACTURER'S GUARANTEE IS FURNISHED, AND ALL WORK IN CONNECTION WITH INSTALLING MANUFACTURER'S GUARANTEED EQUIPMENT. THIS PERSONAL GUARANTEE SHALL EXIST FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK AND SHALL APPLY TO DEFECTS IN MATERIAL AND TO DEFECTIVE WORKMANSHIP OF ANY KIND.

2. FACTORY ASSEMBLED EQUIPMENT AND DEVICES – FOR SUCH ITEMS IN WHICH THE MANUFACTURER FURNISHES A GUARANTEE, AS STANDARD TRADE PRACTICE, OBTAIN SUCH GUARANTEES AND REPLACE ANY SUCH EQUIPMENT WHICH PROVES DEFECTIVE DURING THE LIFE OF THESE GUARANTEES.

3. GUARANTEE ASSURANCE – IN THE EVENT OF FAILURE OF ANY WORK, EQUIPMENT OR DEVICE DURING THE LIFE OF THE GUARANTEE, REPAIR, REPLACE OR RESTORE AT NO COST TO THE OWNER, ANY PARTS OF THE STRUCTURE OR BUILDING WHICH MAY BE DAMAGED EITHER AS THE DIRECT RESULT OF THE DEFECTIVE WORK OR AS A RESULT OF THE CONTRACTOR REPLACING THE DEFECTIVE WORK OR MATERIAL. THIS WORK SHALL BE PERFORMED AT A TIME AND IN A MANNER ACCEPTABLE TO THE OWNER.

ARCHITECTURAL LEGEND

(REFER ARCHITECTURAL DRAWINGS FOR LOCATIONS AND DETAILS)

- FIRE RESISTIVE RATED LINE, 2 HOUR
- SR — NON-RATED SMOKE RESISTIVE
- AREA NOT IN CONTRACT

GENERAL NOTES

1. THE CONTRACTOR SHALL LOCATE ALL NEW CONCRETE PENETRATIONS SUCH THAT THE PENETRATION DOES NOT OCCUR IN A CONCRETE BEAM OR PAN RIB.

2. DRAWINGS:
   a. PLUMBING DRAWINGS ARE TO BE CONSIDERED DIAGRAMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK AND SYSTEMS. IT IS NOT POSSIBLE TO INDICATE EVERY FITTING, VALVE, OFFSET, TRAP, ACCESS PANEL, ETC. THAT IS REQUIRED FOR A PROPER WORKING SYSTEM AND MAINTENANCE THEREOF. NO ADDITIONAL COST WILL BE ALLOWED FOR SUCH ITEMS.

   b. FOR EXISTING SYSTEMS, ALL LINES AND CONDITIONS SHOWN ON THE DRAWING HAVE BEEN SHOWN IN GOOD FAITH. HOWEVER, THERE IS NO IMPLIED GUARANTEE AS TO THEIR SIZE, LOCATION, ELEVATION, COMPLIANCE WITH CURRENT CODES OR CONDITIONS. THE CONTRACTOR SHALL INVESTIGATE ALL EXISTING CONDITIONS AND SHALL MODIFY THE PROPOSED WORK AS REQUIRED OR DIRECTED.

   c. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS, ETC. AND OTHER SPACE CONDITIONS. CHECK DRAWINGS OF OTHER TRADES TO COORDINATE PLUMBING WORK.

3. FEES/INSPECTIONS:
   a. PAY ALL FEES AND ARRANGE FOR ALL INSPECTIONS. SUCH INSPECTIONS ARE TO BE CONDUCTED BY AUTHORITIES HAVING JURISDICTION. ADVISE THE COR/G.C. OF ANY MODIFICATION TO OR DEVIATION FROM THE CONTRACT DOCUMENTS IN ORDER TO COMPLY WITH CODES. ENTERING INTO A CONTRACT WILL BE DEEMED AS EVIDENCE OF COMPLIANCE WITH THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION OVER THE WORK.

4. QUALITY ASSURANCE:
   a. ALL PLUMBING WORK SHALL COMPLY WITH ALL APPLICABLE STATE AND LOCAL CODES AS WELL AS ALL UTILITY COMPANY REGULATIONS. THESE CODES SHALL SUPERCEDE ANY INFORMATION CONTAINED WITHIN THE DRAWING SET CONTRADICTING THESE CODES.

   b. EACH PIECE OF EQUIPMENT SHALL HAVE MANUFACTURER'S NAME, ADDRESS, SERIAL, AND MODEL NUMBERS ON A PLATE SECURELY ATTACHED TO IT.

   c. ALL PIPING ABOVE GRADE SHALL HAVE AN EXPOSED TAG TO IDENTIFY THE PIPE.

   d. EACH PIECE OF EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS OR AS INDICATED ON PLANS.

   e. ALL PLUMBING WORK SHALL BE PERFORMED BY INDIVIDUALS SKILLED IN THIS TRADE AND COMPLETED IN A PROFESSIONAL MANNER.

   f. EACH PIECE OF EQUIPMENT SHALL BE INSTALLED AS FREE FROM NOISE AND VIBRATION AS POSSIBLE.

4. EQUIPMENT DELIVERY AND STORAGE:
   a. DELIVER EQUIPMENT TO THE SITE IN MANUFACTURER'S ORIGINAL PACKAGING. CLEARLY MARK EACH ITEM WITH THE PROPER IDENTIFICATION NUMBER. STORE IN SAFE DRY AREA.

5. EQUIPMENT MANUALS/SUBMITTALS:
   a. SUBMIT EQUIPMENT CATALOGS TO OWNER/G.C. FOR APPROVAL PRIOR TO PURCHASE AND INSTALLATION. ONCE APPROVED, PROVIDE OWNER/G.C. WITH COPIES OF THESE ITEMS.

6. SITE INSPECTION (AS REQUIRED):
   a. CONTRACTOR SHALL ATTEND PRE-BID WALK THROUGH AT THE SITE TO INSPECT EXISTING FACILITIES BEFORE BID IN ORDER TO ENSURE PROPER EVALUATION OF WORKING CONDITIONS AND LOCATIONS OF EXISTING EQUIPMENT AS REQUIRED. CONTRACTOR IS RESPONSIBLE FOR THE INCLUSION OF ALL REQUIRED DEMOLITION IN AREAS UNDERGOING MODIFICATION WHETHER OR NOT SUCH WORK IS INDICATED ON THE DRAWINGS. DEMOLITION SHALL GENERALLY BE ARRANGED TO AGREE WITH THE ACCOMPLISHMENT OF WORK UNDER THE VARIOUS PHASES, IF APPLICABLE, AND IN COORDINATION WITH OTHER TRADES. CONSULT ARCHITECTURAL DRAWINGS FOR OTHER REQUIREMENTS.

PRODUCTS/MATERIALS

1. PLUMBING FIXTURES/EQUIPMENT:
   a. ALL PLUMBING FIXTURES/EQUIPMENT SHALL BE AS INDICATED ON THE FIXTURE SCHEDULE OR AN APPROVED EQUAL.

2. PIPING:
   a. DOMESTIC WATER PIPING ABOVE GRADE – SHALL BE TYPE "L" HARD COPPER TUBING AND CAST BRONZE OR WROUGHT COPPER SOLDER JOINT FITTINGS. SOLDER SHALL BE LEAD FREE, HAVING A COMPOSITION SIMILAR TO 95.5% TIN, 4% COPPER AND 0.5% SILVER AS MANUFACTURED BY ENGELHARD CORP. OR EQUAL. VALVES IN DOMESTIC WATER PIPING 2" AND SMALLER SHALL BE BRONZE BODY WITH FULL PORT STAINLESS STEEL BALL VALVE WITH LEVER HANDLE. INSULATION SHALL BE 3/4" THICK, PREFORMED FIBERGLASS WITH VAPOR BARRIER JACKET. AS AN OPTION, FOR PIPE SIZES 2" AND SMALLER, THE CONTRACTOR MAY USE A 3/8" THICK PRE-MOLDED FOAM PLASTIC SIMILAR TO "ARMAFLEX". IN EITHER CASE THE INSULATION MATERIAL SHALL HAVE A FLAME SPREAD RATING OF 25 AND A SMOKE GENERATED RATING OF 50.
      i. PROVIDE REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTOR AT DOMESTIC WATER ENTRY TO BUILDING. PROVIDE SHUT-OFF VALVES BEFORE AND AFTER BACKFLOW PREVENTOR FOR MAINTENANCE. ENTIRE ASSEMBLY SHALL BE HOUSED IN VALVE BOX WITH SURFACE ACCESS. UPGRADE AS REQUIRED BY CODE. AIR GAP DRAIN TO MOP SINK AND SUPPORT AS REQUIRED.

   b. CONDENSATE DRAIN PIPING – SHALL BE P.V.C. DWV SCH. 40 OR TYPE "L" HARD COPPER TUBING. INSULATE CONDENSATE DRAIN WITH A PREFORMED NITRIL RUBBER BASED ELASTROMETRIC PIPE INSULATION, SECURED WITH ADHESIVE. INSULATION THICKNESS SHALL BE 3/4" THICK.

   c. SANITARY WASTE & VENT PIPING ABOVE GROUND – SHALL BE NO-HUB CAST IRON PIPE AND FITTINGS WITH NEOPRENE SLEEVE AND STAINLESS STEEL DRAW BAND JOINTS, OR WHERE ALLOWED, THE CONTRACTOR MAY USE P.V.C. SCHEDULE 40 DWV PIPING AND FITTINGS. FLOOR SINK THAT SERVE BEVERAGE UNITS TO BE "DURIRON" OR EQUAL.

   d. SANITARY WASTE & VENT PIPING BELOW GROUND – SHALL BE SERVICE WEIGHT CAST IRON PIPE, BELL AND SPIGOT TYPE WITH NEOPRENE GASKET JOINTS.

3. METER:
   a. INSTALL NEW WATER METER PER KCAB CRITERIA. FUNCTIONAL PHONE LINE REQUIRED WITHIN 4'-0" OF METER (REFER TO E1.0). MOUNT METER ON WALL 60" AFF. METER TO BE PROVIDED WITH LOCKABLE BALL VALVE BY-PASS.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

CONSULTANTS:

ARCHITECT/ENGINEERS:

PARADIGM
ENGINEERS AND CONSTRUCTORS
200 Envoy Circle #201, Louisville KY 40299 – PH: 502.339.8511 – www.paradigmusa.com

19 May 2015
STATE OF KENTUCKY
BLAINE CASSEL VAN GANSBEKE
24,738
LICENSED PROFESSIONAL ENGINEER

Drawing Title	PLUMBING ABBREVIATIONS, SYMBOLS, AND GENERAL NOTES
Project Title	REMODEL CARDIAC CATH LAB SUITE
Project Number	635-CS1-102
Building Number	F
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Location	OKLAHOMA CITY VAMC, 921 N.E. 13TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Drawing Number	P-001

Office of Construction and Facilities Management
Department of Veterans Affairs

Revisions: | Date

VA FORM 08-6231

NOTES

A. REFER TO DWG. P-001 FOR PLUMBING LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

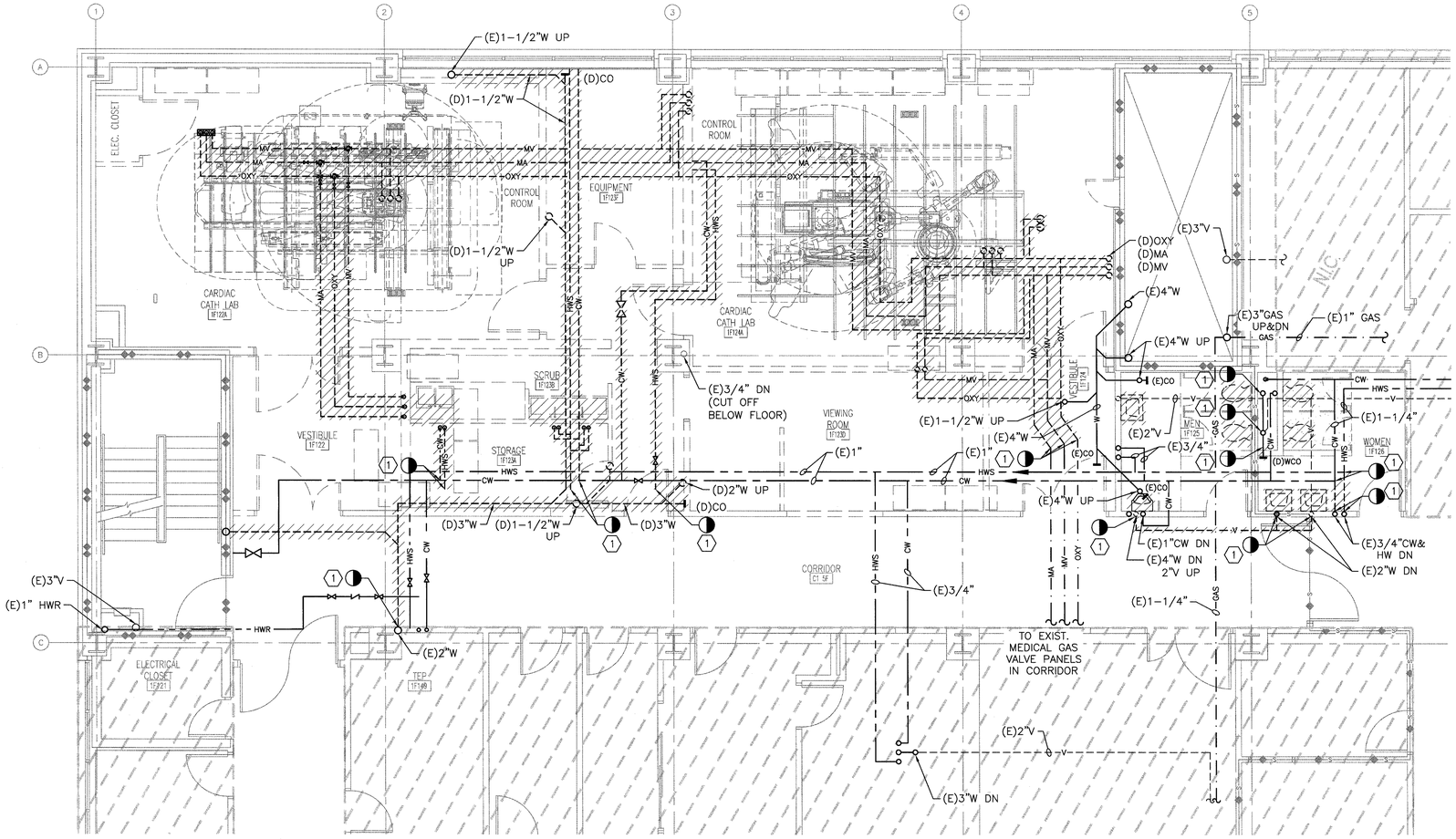
B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

C. REFER TO SHEET PP101 FOR PLUMBING NEW WORK.

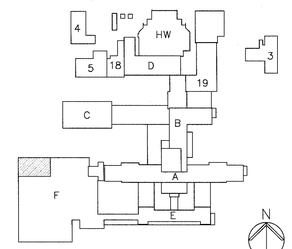
D. REFER TO SHEET PS101 FOR SANITARY/VENT NEW WORK.

KEY NOTES ⬡

1. REMOVE/DEMOLISH WORK AS INDICATED BACK TO THIS POINT.



F1 PARTIAL FIRST FLOOR PLAN
SCALE 1/4" = 1'-0"



KEY PLAN - FIRST FLOOR
N.T.S.

FULLY SPRINKLERED
BID DOCUMENTS
FOR CONSTRUCTION

Revisions	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

PARADIGM
ENGINEERS AND CONSTRUCTORS
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STATE OF KENTUCKY — BLAINE CARROL VAN GAMPEKE 34,788 LICENSED PROFESSIONAL ENGINEER — May 2015

Drawing Title	PLUMBING AND SANITARY/VENT DEMOLITION PLAN FIRST FLOOR
Approved Project Director	
Control Number	VA256-13-C-0277
PO Number	635-C35336
Project Title	REMODEL CARDIAC CATH LAB SUITE
Location	OKLAHOMA CITY VAMC 921 NE 13TH STREET, OKLAHOMA CITY, OK 73104
Date	05-21-2015
Checked	KLP
Drawn	JDM
Project Number	635-CS1-102
Building Number	F
Drawing Number	PD101

Office of Construction and Facilities Management
Department of Veterans Affairs

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PLUMBING FIXTURE SCHEDULE

MARK	DESCRIPTION	WASTE PIPE	VENT PIPE	COLD WATER	HOT WATER	WASTE FIXTURE UNITS	WATER FIXTURE UNITS	WRIST BLADE HANDLES	ELECTRIC SENSOR	REMARKS
		IN	IN	IN	IN					
P-115	WATER CLOSET	3	2	1-1/4	–	3	3	N/A	YES	
P-421	LAVATORY	2	1-1/2	1/2	1/2	2	2	N/A	YES	
P-422	LAVATORY	2	1-1/2	1/2	1/2	2	2	N/A	YES	
P-519	DBL. COMP. SCRUB SINK	3	2	1/2 (2)	1/2 (2)	3	4	N/A	YES	

NOTES

A. REFER TO DWG. P-001 FOR PLUMBING LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

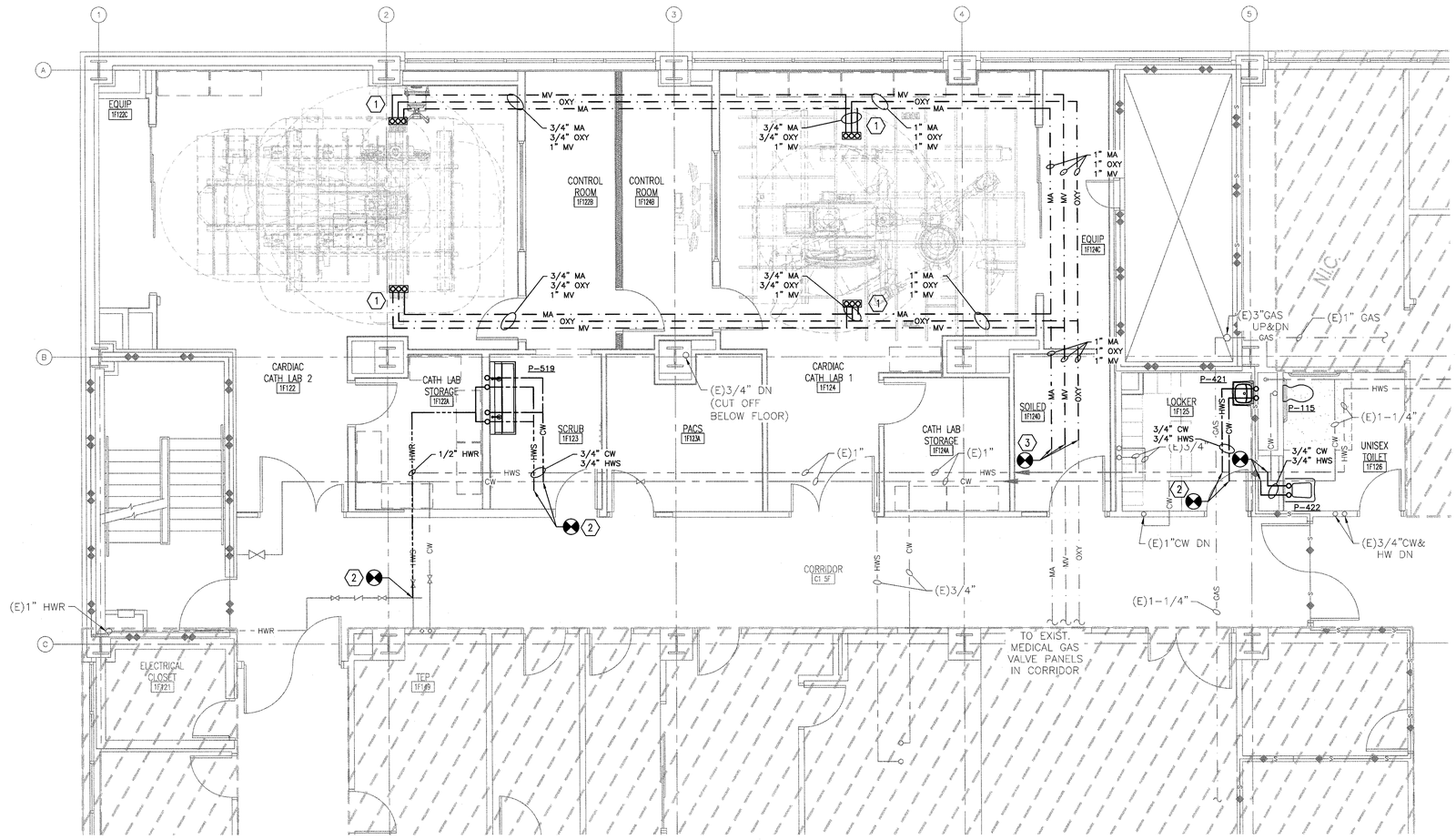
B. ALL EXISTING PIPING, DUCTWORK, SPRINKLERS, CONDUIT, LIGHTING OR OTHER CONSTRUCTION SHALL BE RELOCATED AS REQUIRED FOR ALL DEMOLITION AND INSTALLATION WORK.

C. REFER TO SHEET PD101 FOR PLUMBING DEMOLITION.

D. REFER TO SHEET PS101 FOR SANITARY/VENT NEW WORK.

KEY NOTES ⬡

1. HOSE OUTLET LOCATION IN CEILING FOR MEDICAL GAS (OXYGEN, AIR, VACUUM) LINES; REFER TO EQUIPMENT SUPPLIER FOR EXACT LOCATION.
2. NEW TIE-IN LOCATION. PROVIDE NEW ISOLATION VALVES.
3. NEW MEDICAL GAS LINES TO BE EXTENDED FROM THIS LOCATION. RE-CERTIFY ALL WORK BACK TO ZONE VALVES.



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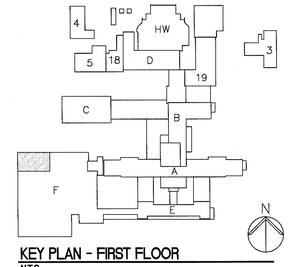

KEY PLAN - FIRST FLOOR
N.T.S.

FULLY SPRINKLERED
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Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:
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BLAKE CASEY VAN GANSBEKE 24,738 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY

Drawing Title: PLUMBING PLAN FIRST FLOOR		Project Title: REMODEL CARDIAC CATH LAB SUITE	Project Number: 635-CS1-102
Approved Project Director	Control Number: VA256-13-C-0277	Location: OKLAHOMA CITY VAMC, 921 NE 13TH STREET, OKLAHOMA CITY, OK. 73104	Building Number: F
	PO Number: 635-C35336	Date: 05-21-2015 / Checked: KLP / Drawn: JDM	Drawing Number: PP101

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231

NOTES

A. REFER TO DWG. P-001 FOR PLUMBING LEGEND, ABBREVIATIONS, AND GENERAL NOTES RELATED TO THIS SHEET.

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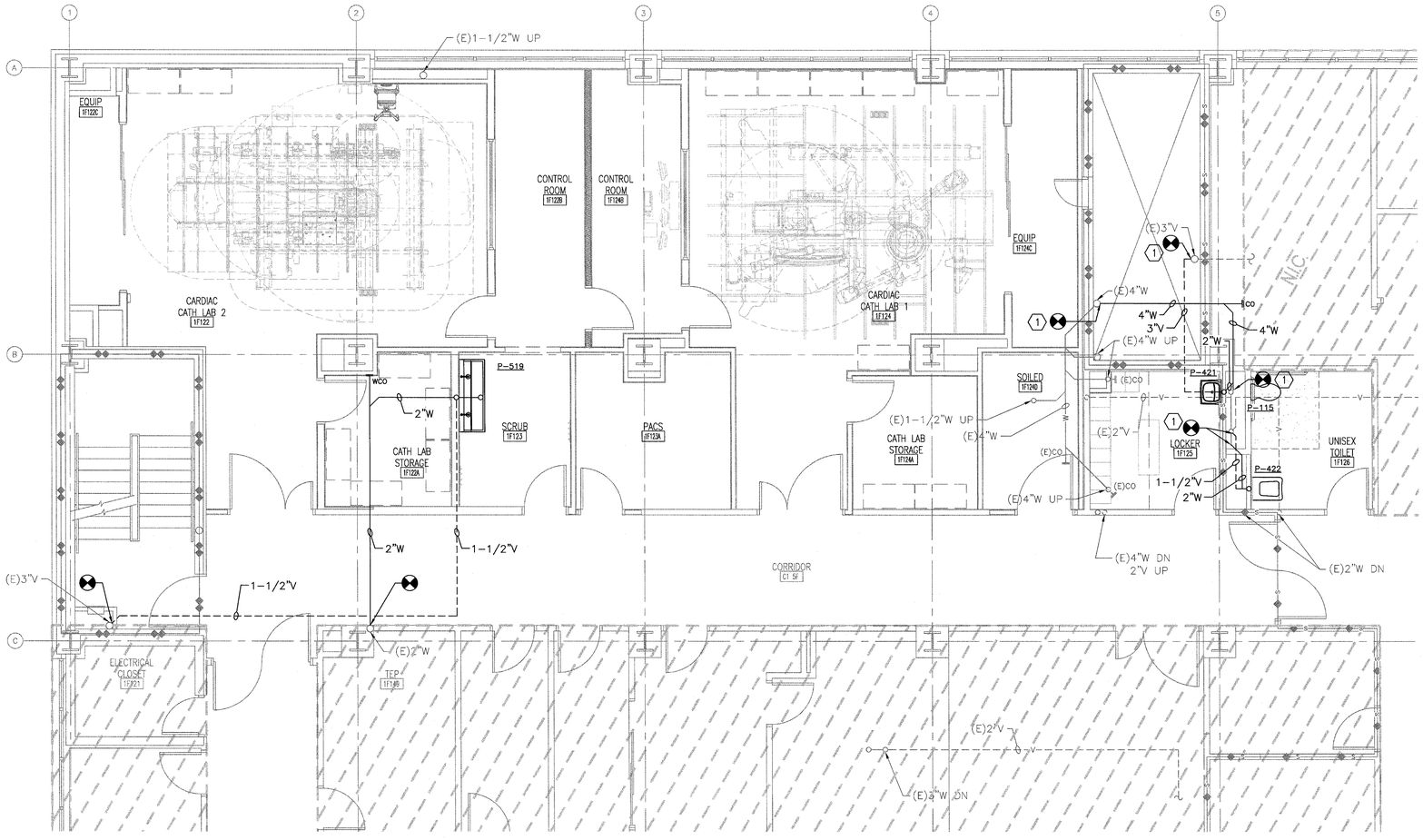
C. REFER TO SHEET PD101 FOR SANITARY/VENT DEMOLITION.

D. REFER TO SHEET PP101 FOR PLUMBING NEW WORK.

KEY NOTES ⬡

1. CONNECT TO EXISTING WASTE AND VENT WITHOUT INTERRUPTION OF SERVICE TO OTHER AREA.



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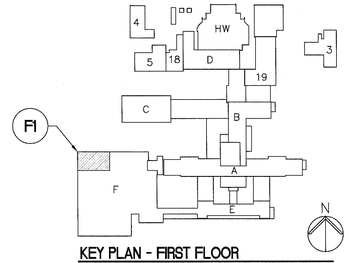

KEY PLAN - FIRST FLOOR
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BLAINE CASEY VAN GAMBEKE 24,788 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY

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